

Raychem

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December 1, 1994

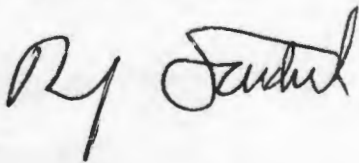
Mr. Leon Panetta
White House Chief of Staff
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

Dear Mr. Panetta:

We are delighted by the progress being made on water quality standards for the San Francisco Bay-Delta. On behalf of the business community, I strongly encourage removing any remaining conflicts between various state and federal proposals. We feel that you have made great progress so far, and you are closer to the goal line. Failure to reach closure would be a real blow to businesses throughout this State.

We have written to President Clinton and Governor Wilson asking for a solid commitment to achieve standards for the Bay-Delta this year. We know you will do everything in your power to insure that this goal is reached.

Very truly yours,

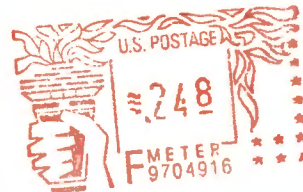


cc: The Honorable Bruce Babbitt
The Honorable Ronald H. Brown
The Honorable Carol M. Browner

31 DEC 8 4:58

Raychem Corporation
300 Constitution Drive
Menlo Park, CA 94025-1164

**PRESORT
FIRST CLASS**



The Honorable Carol M. Browner
Administrator, Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460



AGENDA
TECHNICAL DISCUSSIONS ON
BAY-DELTA NATURAL RESOURCES

MONTEREY BEACH HOTEL
December 1, 1994

- 9:00 a.m. Opening Remarks
 Club FED
 State
 Urban Representative
 Agriculture Representative
 Environmental Coalition
- 9:30 a.m. Summary of Proposals -- Panel 20 each
 Urban-Agriculture Coalition
 Environmental Coalition
 Club FED
- 11:00 a.m. Identification of Areas of Technical
 Differences and Panel Discussions on Each
 (Current Topics, Subject to Revision): 15 each
- San Joaquin River: Spring Measures for
 Salmon Outmigration and Delta Smelt
 Protection
 -- Export Limits: Flow Ratios Relative to
 QWEST; Seasonality -- February, March -
 June, and July - January
 -- Category III Items from the Urban-
 Agriculture Coalition
- 3:00 p.m. Summary Discussion of Future Actions and Needs
- 4:00 p.m. End

Federal Attendees:

USBR - Fufts/Patterson
 EPA - Marcus/Perniasayel Seraydarian/Wright/Hayler
 FWS - Spear/White/Hall/Goude
 NMFS - Lecky/Storn/Kimball
 DOI - Rieke/Cottingham/Nawi

OTHER FACTORS ESSENTIAL ELEMENTS

INSTITUTIONAL-REGULATORY COMMITMENT

REGULATED COMMUNITY COMMITMENT

FINANCIAL RESOURCES AVAILABLE

TIME SCHEDULE FOR IMPLEMENTATION

**MONITORING PROGRAM TO ASSESS EFFECTIVENESS AND
COMPLIANCE**

ENFORCEMENT

*Alvin Lee
12/01/04
COW # - 449
Montney C#*

OTHER FACTORS

UNSCREENED AGRICULTURAL DIVERSIONS

WASTE DISCHARGE CONTROL & POLLUTION PREVENTION

LEGAL FISHING

ILLEGAL FISHING

LAND-DERIVED SALTS

EXOTIC SPECIES

RIPARIAN, WETLAND, & ESTUARINE HABITAT RESTORATION

**DELTA CHANNEL ALTERATIONS & LOCAL LAND USE
MODIFICATIONS**

**NON-OUTFLOW RELATED FACTORS
AND
HABITAT AND MEASURES TO IMPROVE FISH TRANSPORT
(OTHER FACTORS)**

**PAST STUDIES OF THE DELTA: EFFECT OF WATER PROJECTS ON
FISHERY**

RATIONALE FOR INCLUDING OTHER FACTORS

**WATER PROJECT OPERATIONS DO NOT ACCOUNT FOR ALL
ENVIRONMENTAL EFFECTS**

RECENT ANALYSES: IMPORTANCE OF OTHER FACTORS

**MUST ADDRESS OTHER FACTORS TO ENSURE ADEQUATE
IMPROVEMENT**

SIGNIFICANT IMPROVEMENT FOR LOWER WATER REQUIREMENT

WATER PROJECT EFFECTS

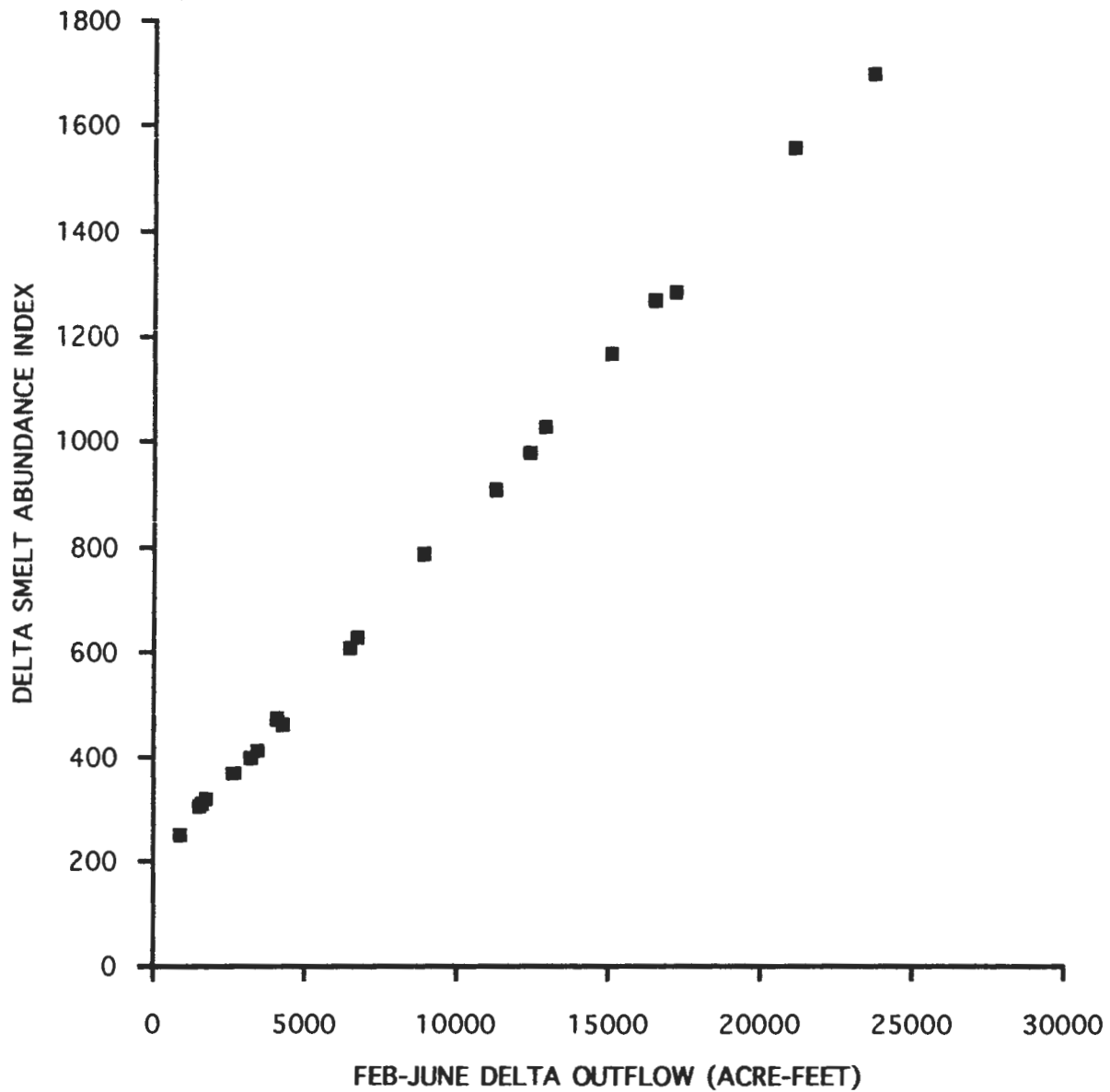
TYPICALLY ACCOUNT FOR LESS THAN 50% OF VARIATION IN ENVIRONMENTAL EFFECTS

REMAINING VARIATION

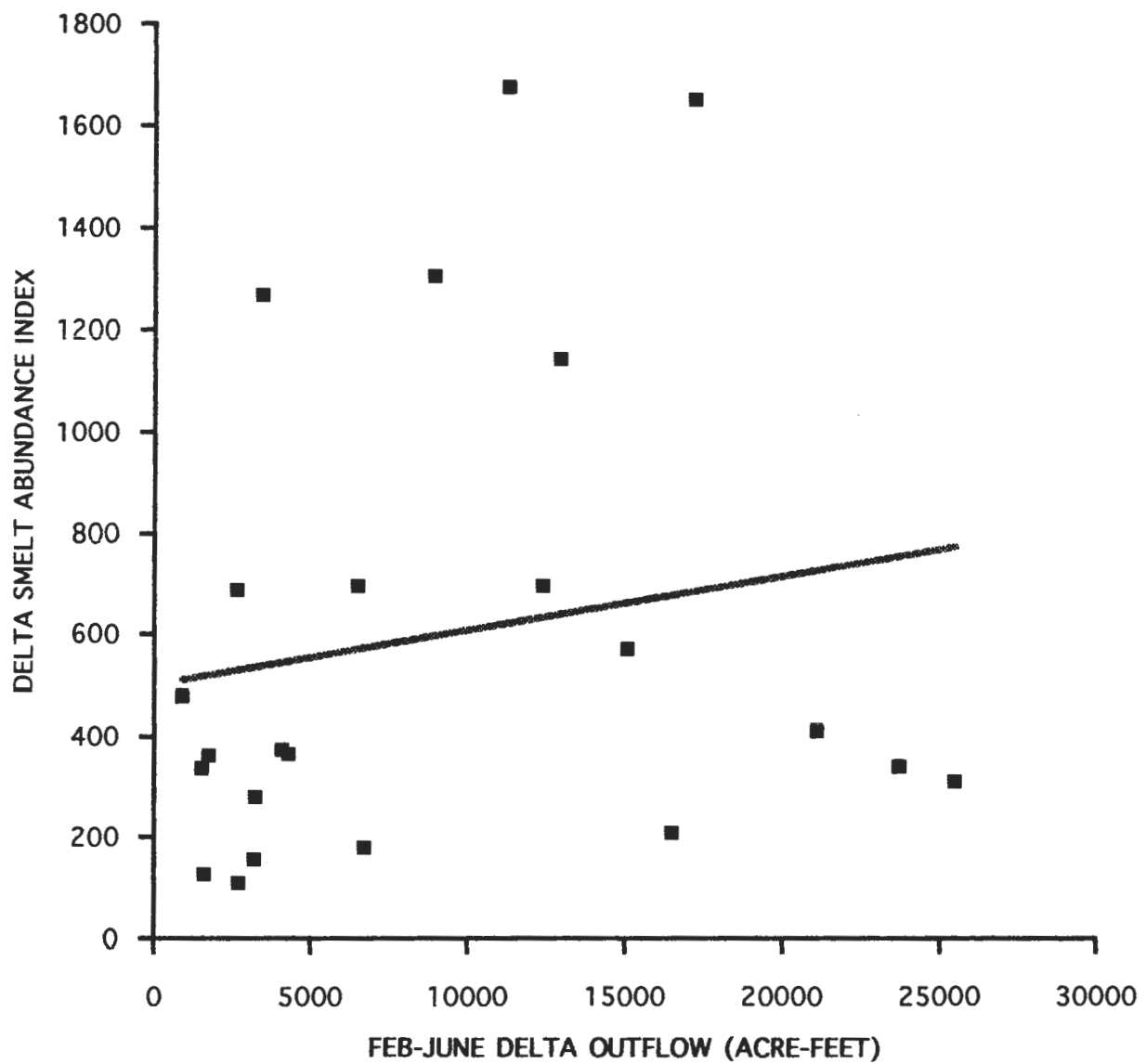
RANDOM NATURE OF BIOLOGICAL DATA

OTHER FACTORS

IMPLICITLY ASSUMED DATA
FOR
DELTA SMELT ABUNDANCE
VS.
FEB-JUNE DELTA OUTFLOW



ACTUAL DATA
FOR
DELTA SMELT
VS.
FEB-JUNE DELTA OUTFLOW



EXAMPLES OF EFFECTS OF OTHER FACTORS

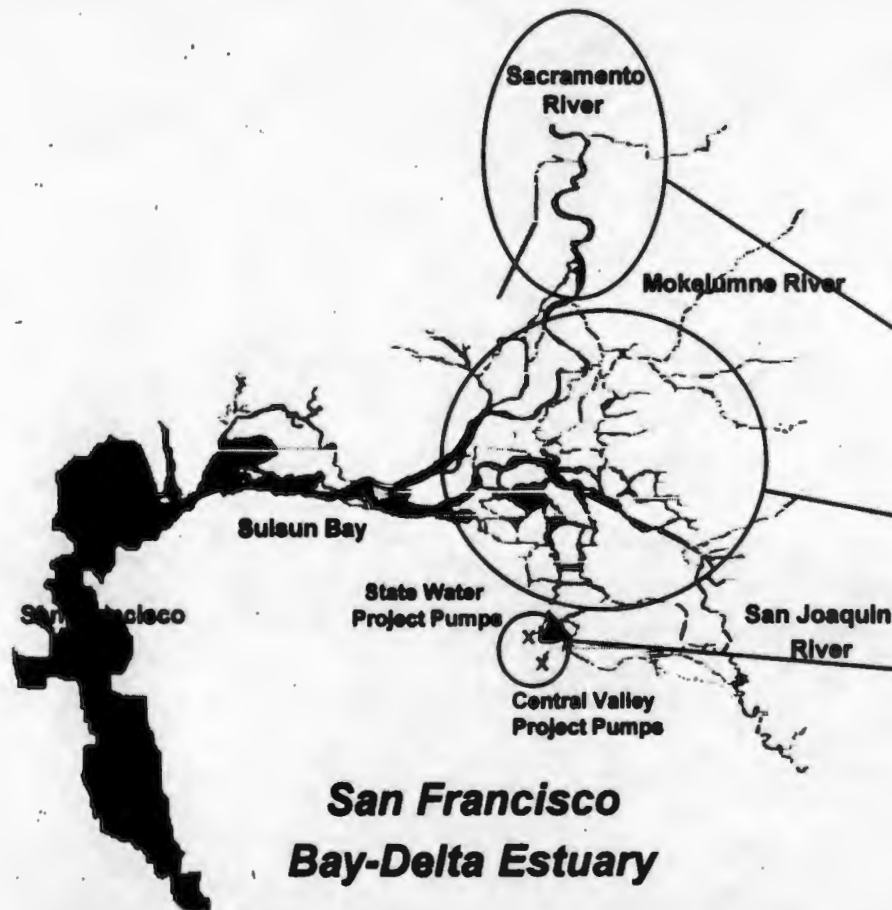
UNSCREENED AGRICULTURAL DIVERSIONS

1800 SUCH DIVERSIONS IN DELTA, 300 MORE UPSTREAM

MAY-JUNE 1994 SAMPLING:

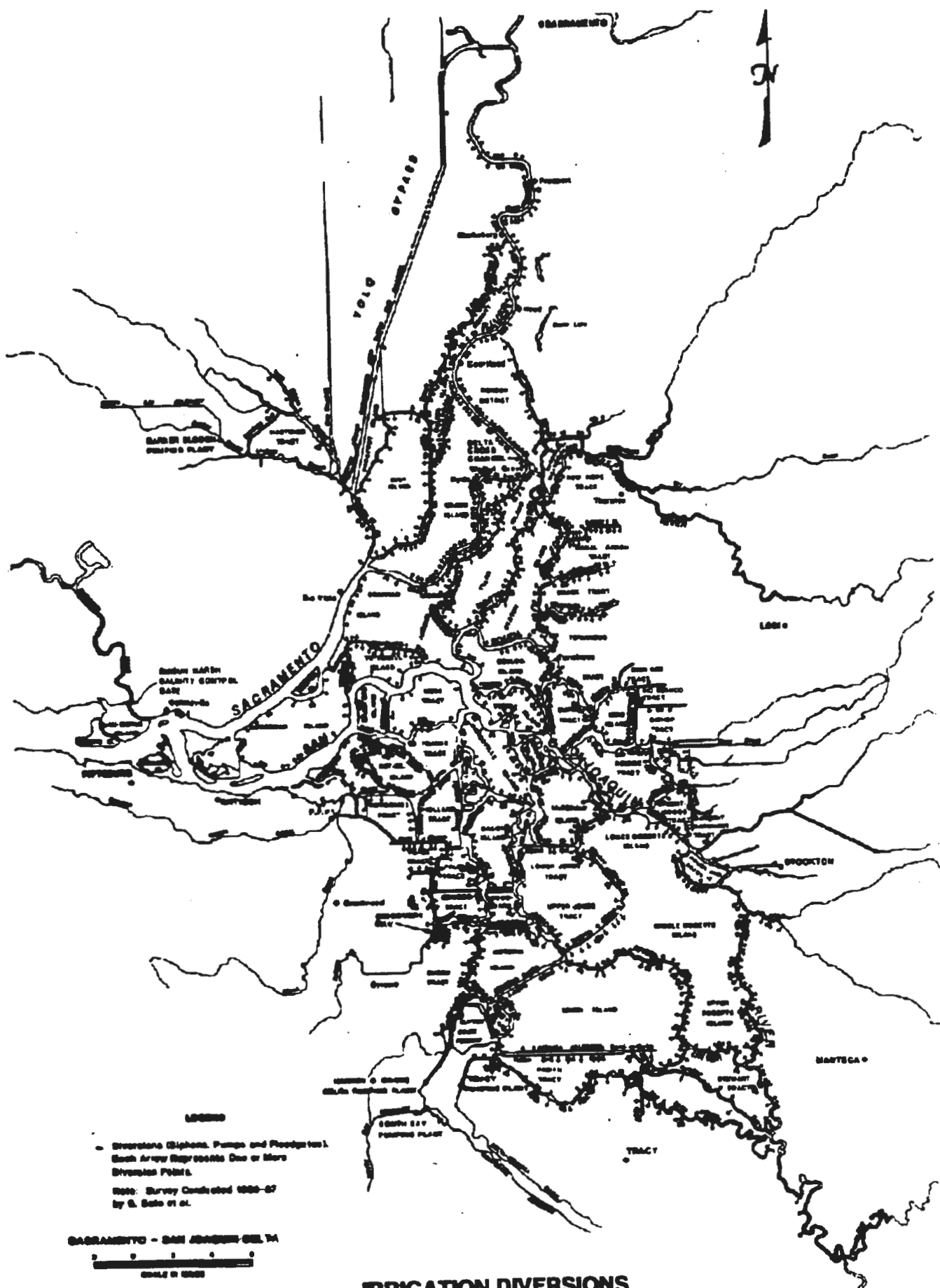
**AS MANY OR MORE DELTA SMELT DIVERTED ONTO DELTA
ISLANDS AS AT STATE/FEDERAL PUMPS**

Basis for Addressing Unscreened Diversions



➤ The entrainment at unscreened Delta diversions is believed to be equivalent in magnitude to the entrainment at the screened diversions at the State/Federal pumping plants.

- 300 unscreened Sac. River diversions (1.2 million acre-feet annually)
- 1,800 unscreened Delta diversions (2.0 million acre-feet annually)
- 2 screened diversions (State/Federal projects) (6-7 million acre-feet annually)



EXAMPLES OF EFFECTS OF OTHER FACTORS

FISHING

1987-1991 (DROUGHT YEARS)

2/3 OF ADULT SALMON HARVESTED

**ALMOST TWICE THE HARVEST RATE OF ANY 5-YEAR PERIOD
SINCE 1967**

1/3 OF WINTER RUN ADULTS HARVESTED

EXAMPLES OF EFFECTS OF OTHER FACTORS TOXICS IN DELTA INFLOW

USGS DATA:

FEBRUARY, 1993, 500 TONS DIAZINON CAME DOWN SACRAMENTO RIVER

NPDES WASTEWATER DISCHARGER BIOASSAYS (FEDERAL PROTOCOL)

SINCE 1992, 60% OF TESTS ON RIVER WATER SHOWED TOXIC EFFECTS

UC DAVIS STUDIES

2/3 OF BIOASSAYS OF SACRAMENTO RIVER AT HOOD SHOWED CHRONIC TOXICITY

NUMEROUS OTHER EXAMPLES

EXAMPLES OF EFFECTS OF OTHER FACTORS

EXOTIC SPECIES

ASIAN CLAM, POTAMOCORBULA AMURENSIS

INLAND SILVERSIDE

STRIPED BASS

COPEPODS, SINOCALANUS AND PSUEDODIAPTOMOUS

NUMEROUS OTHERS

TUESDAY
NOVEMBER 29, 1994

Serving Northern California Since 1851

Destructive crab found in S.F. Bay

Delicacy for some may mean trouble for local aquatic life

BY JANET RAB-DUPREE
Mercury News Staff Writer

A prolific, mitten-clawed crab with the alarming capacity to destroy levees and consume nearly every aquatic plant in its path has been found at the mouth of Coyote Creek near Alviso and has been seen head-

ing into the delta, scientists warned Monday.

If the Chinese mitten crabs, as the six-inch invaders are known, reproduce as freely as they did when they made their way to Germany in the 1890s, researchers fear they could prove to be among the most destructive creatures introduced to San Francisco Bay this century.

"These little guys could be very bad news for California's ecology, for California's agriculture and for California's water agencies," said marine biologist Andy Cohen of the University of California, Berkeley, who spe-

See CRABS, Page 7A



JASON M. GROW — MERCURY NEWS

A Chinese mitten crab captured from the bay.

7A

Foreign crab threatens bay, delta ecosystems

A STRANGE INVADER

Here are a few facts about the Chinese mitten crab:

- They are catadromous, living in fresh-water rivers their entire adult lives but descending into salt-water estuaries and bays to spawn. The only other catadromous organism in North America is the Atlantic river eel.
- They live three to five years, beginning life as free-floating larvae. In the late fall and winter, older crabs migrate downstream to mate and then die.
- Each female crab carries as many as 250,000 to 1 million fertilized eggs in a thick mass under a plate on its abdomen.
- Mitten crab larvae are believed to have been carried to northern Europe in ship ballast water in 1912. Adult crabs thrived in German rivers and spread into France, Finland and Sweden. Some were found in England, but the crab never flourished there.

Source: Karen Grimmer, educational director, Marine Science Institute.

Other invaders "don't get up out of rivers and walk around dams, and these guys do," said Cohen, pushing one of the dexterous escape artists back into its holding tank for the umpteenth time. "This crab has the potential to affect us in so many different ways."

■ CRABS from Page 1A

cializes in studying the more than 200 foreign species that have invaded the bay in the past 140 years.

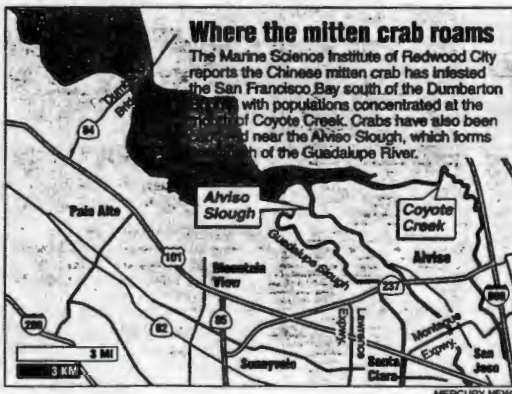
Researchers from the Marine Science Institute in Redwood City say they have caught four of the hairy-pincered crabs just north of Alviso Slough in the past 10 days, including a female laden with at least a quarter-million microscopic eggs.

Scientists familiar with the crab, which spends most of its adulthood in fresh-water rivers and sloughs but migrates to salt water to breed, fear the hardy *eriocheir sinensis* could pose a serious threat to both bay and river ecosystems.

European precedent

The crabs multiplied so freely in Germany that river banks moved with the gray and white mottled invaders. During the peak of a government crab eradication program, German workers — who called the creatures wool-hand crabs — raked in more than 3 million each year to be boiled and ground up as pig food.

Adult mitten crabs burrowing out temporary homes for themselves weakened dikes in the Netherlands before European of-



ficials got the crustaceans under control.

The crabs could easily undermine vital levees in the South Bay, especially around the San Jose community of Alviso, which is several feet below sea level, and they could reach into the Sacramento-San Joaquin River Delta. Scientists already have heard unconfirmed reports that fishermen in San Pablo Bay have seen the creatures.

Although it is possible the

crabs arrived as tiny free-floating larvae in ballast water aboard an ocean-going ship, Cohen suspects someone may have deliberately put mitten crabs in San Francisco Bay because of their value as a tasty Asian delicacy.

It has been illegal to import living mitten crabs since the mid-1980s, Cohen said, but the creatures still can be found for sale in San Francisco and Los Angeles fish markets for \$12 to \$14 a pound.

"I'm told people eat them fried, boiled and pickled in rice wine," Cohen said. "Some people also eat them raw, but that's not a good idea at all."

Mitten crabs are host to an Oriental lung fluke that burrows into the internal organs of mammals — including humans — that eat the crab raw or after insufficient cooking, Cohen said. In some parts of China where the crab is an especially popular dish, nearly half the human population has been infected with the parasite.

It is difficult to know how quickly the crabs might adapt to California's waters, Cohen said, but with no natural predators, they could spread rapidly.

Scientists did not know about the crab's presence in the bay until Nov. 18, when Marine Science Institute researchers took three specimens to the California Academy of Sciences in Golden Gate Park. Marine biologists there identified the creatures.

Shrimpers report

Over the next few days, Cohen began interviewing shrimp fishermen to see whether they had noticed the crab. Some said they first began catching mitten crabs in their nets three years ago and that they now often pull in two or three of the crabs per catch.

If the crustaceans multiply as

scientists fear they will, they will compete with the Asian clam and the Atlantic ship worm for the dubious title of the bay's most destructive alien resident.

Within two years of the tiny Asian clam's arrival in 1886, scientists were finding concentrations of 20,000 clams per square foot in some North Bay areas, Cohen said. Besides elbowing out all other bottom-dwelling creatures, the fast and efficient filter feeders may now be consuming most of the plankton that make up the base of the bay's food chain.

Atlantic ship worms, wood-burrowing creatures that arrived in the bay around 1915, flourished in similar numbers at first, Cohen said. In 1919 and 1920, so many of them burrowed into untreated wood pilings and support posts that at least 50 piers, wharves and bridges collapsed without warning. Cohen estimates the worms caused \$500 million damage, figured in today's dollars, in less than two years.

Mitten crabs could perform similar procreative feats in the bay's sloughs and estuaries, Cohen said. A big problem is that the crabs also spread into fresh water; swarms of mitten crabs have fed on rice crops as far as 800 miles into inland China along the banks of the Yangtze River.

OTHER FACTORS PHASING OF IMPLEMENTATION

**JOINT AG-URBAN PROPOSAL: OTHER FACTORS MARKEDLY
INCREASE ENVIRONMENTAL PROTECTION**

**HOWEVER, IMPLEMENTATION OF SOME OTHER FACTORS COULD
TAKE YEARS**

**THEREFORE, POSSIBLE FAST-TRACKING OF SELECTED OTHER
FACTORS**

**OTHER FACTORS
FAST TRACKING POSSIBILITIES FOR DISCUSSION
(WATER YEAR 1996)**

**SCREENING OR “FISHERY PROTECTION WATER BANK” FOR
REDUCTION OF UNSCREENED DELTA AG DIVERSIONS**

CONTROL OF SELECTED TOXICS

RE-EVALUATE HARVEST REGULATIONS

BUY-OUT OF SOME OCEAN FISHING

EVEN MORE ENFORCEMENT AGAINST ILLEGAL FISHING

JOINT WATER USE COMMITMENT REGARDING OTHER FACTORS

PROVIDE WITHIN 60 DAYS

IDENTIFICATION OF THOSE CATEGORY III MEASURES WITH MOST IMMEDIATE ENVIRONMENTAL BENEFIT

ESTIMATED COSTS OF IMPLEMENTATION OF EACH “IMMEDIATE” MEASURE

PLAN FOR EFFECTIVE USE OF CURRENT STATE/FEDERAL ENVIRONMENTAL AND MITIGATION FUNDS

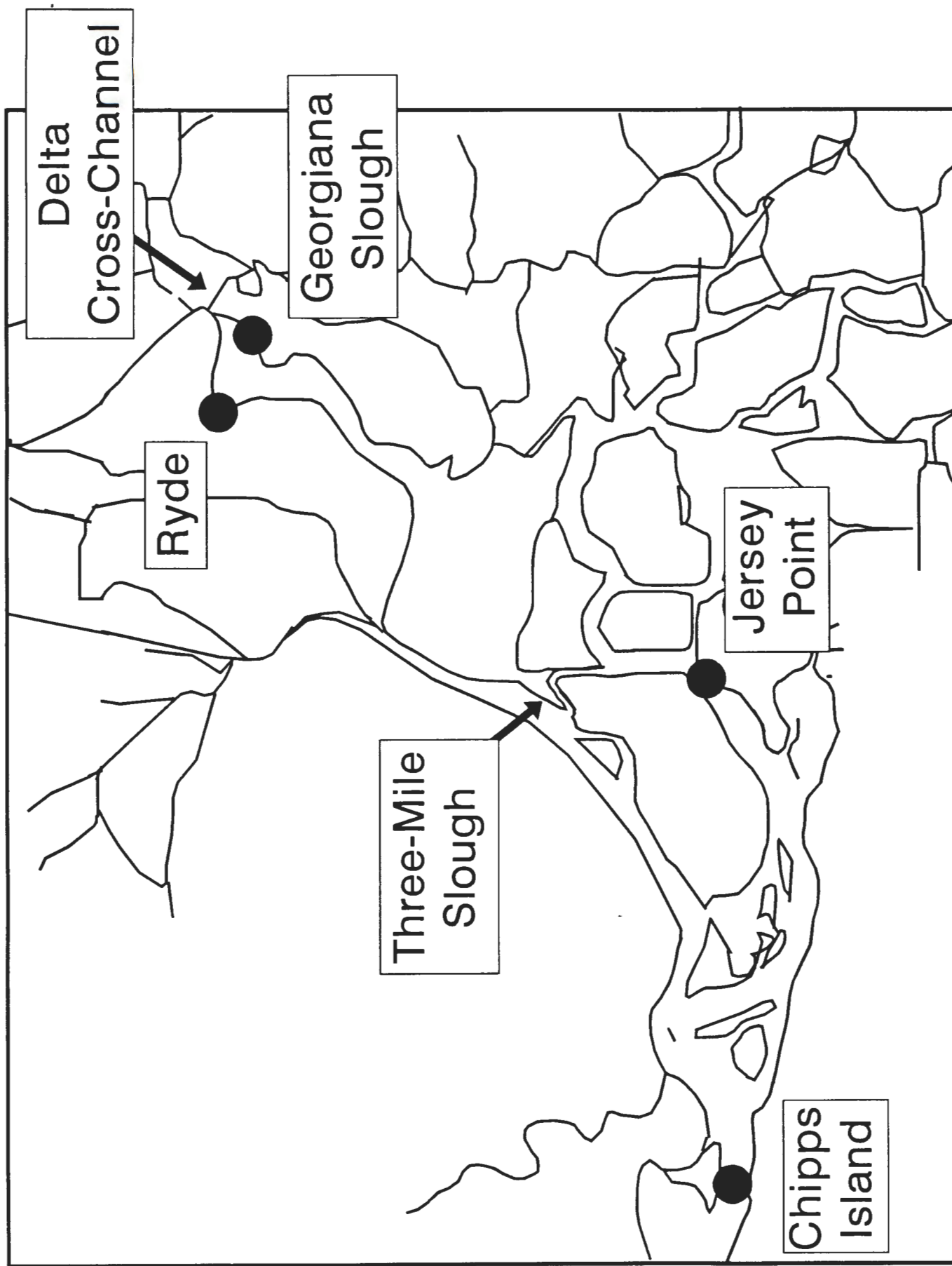
IMPLEMENTATION SCHEDULE

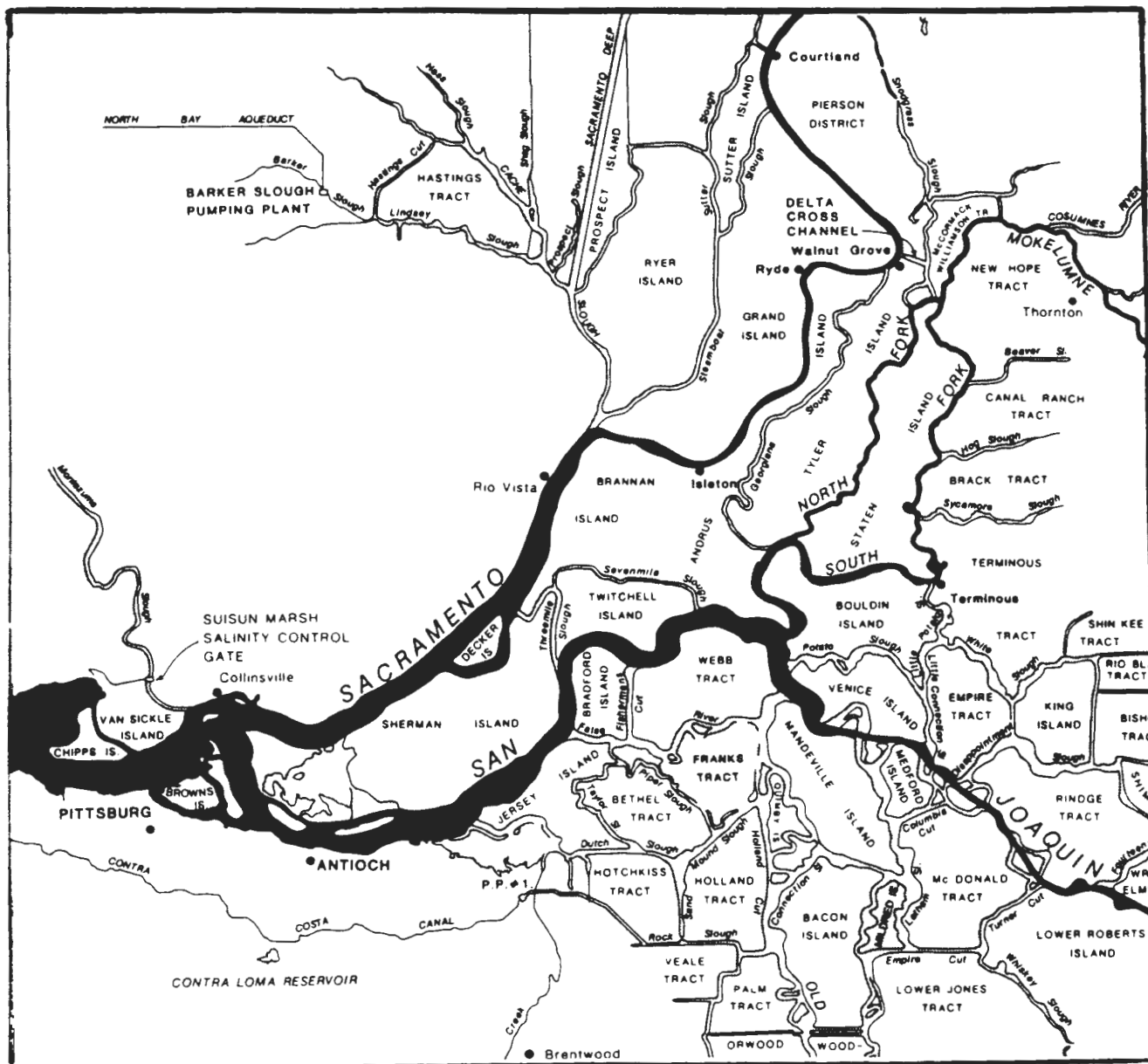
SUPPORT, AT STATE AND FEDERAL LEVEL, NEW SOURCES OF FUNDING FOR CATEGORY III WHERE EXISTING FUNDING IS INADEQUATE

Admin Rec
Submitted by
COWA-Ag
at Monterey
Ricketts/Periaspe
12/01/94

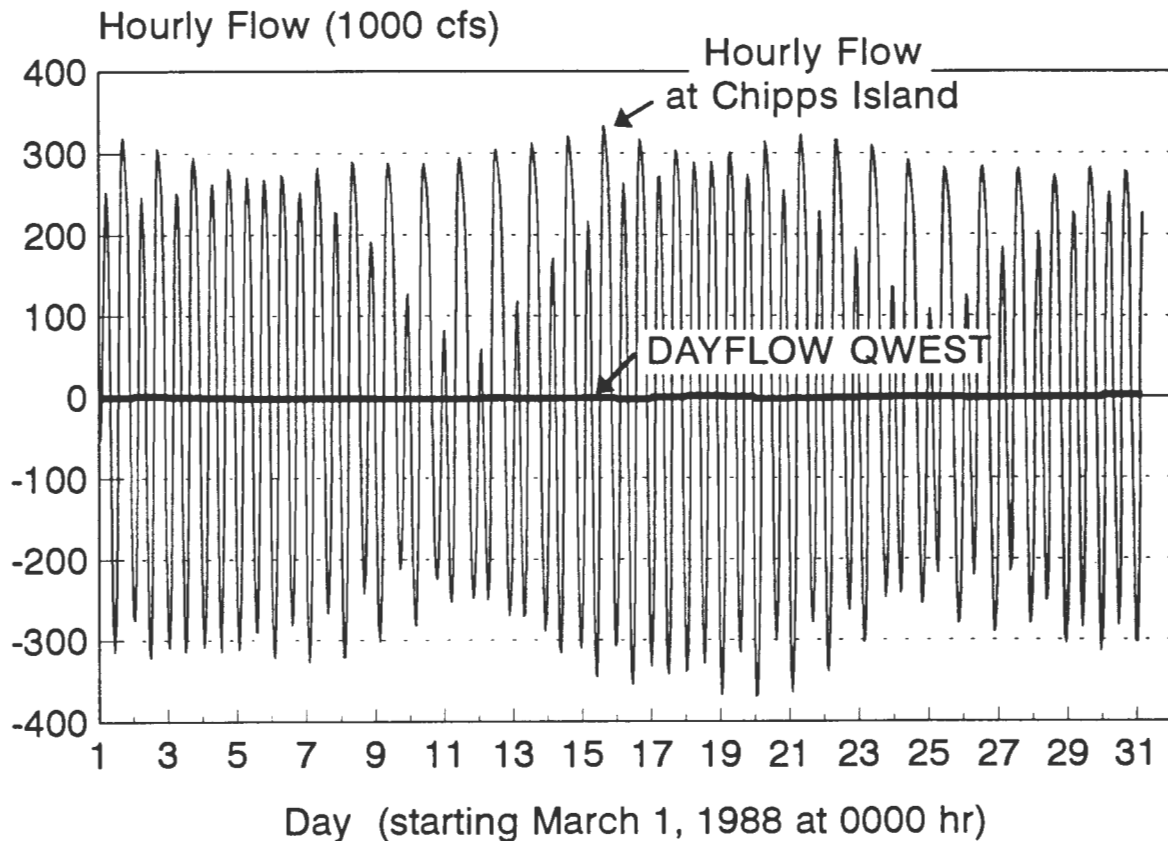
There is no scientific basis for a QWEST standard

- Salmon Smolt Survival
 - ▶ Reanalysis of experimental data shows no scientifically valid correlations with QWEST
- Hydrodynamics
 - ▶ Tidal flows dominate over daily mean transport.
- Salinity ("Salt cues")
 - ▶ No discernable trend with reverse flow (negative QWEST).



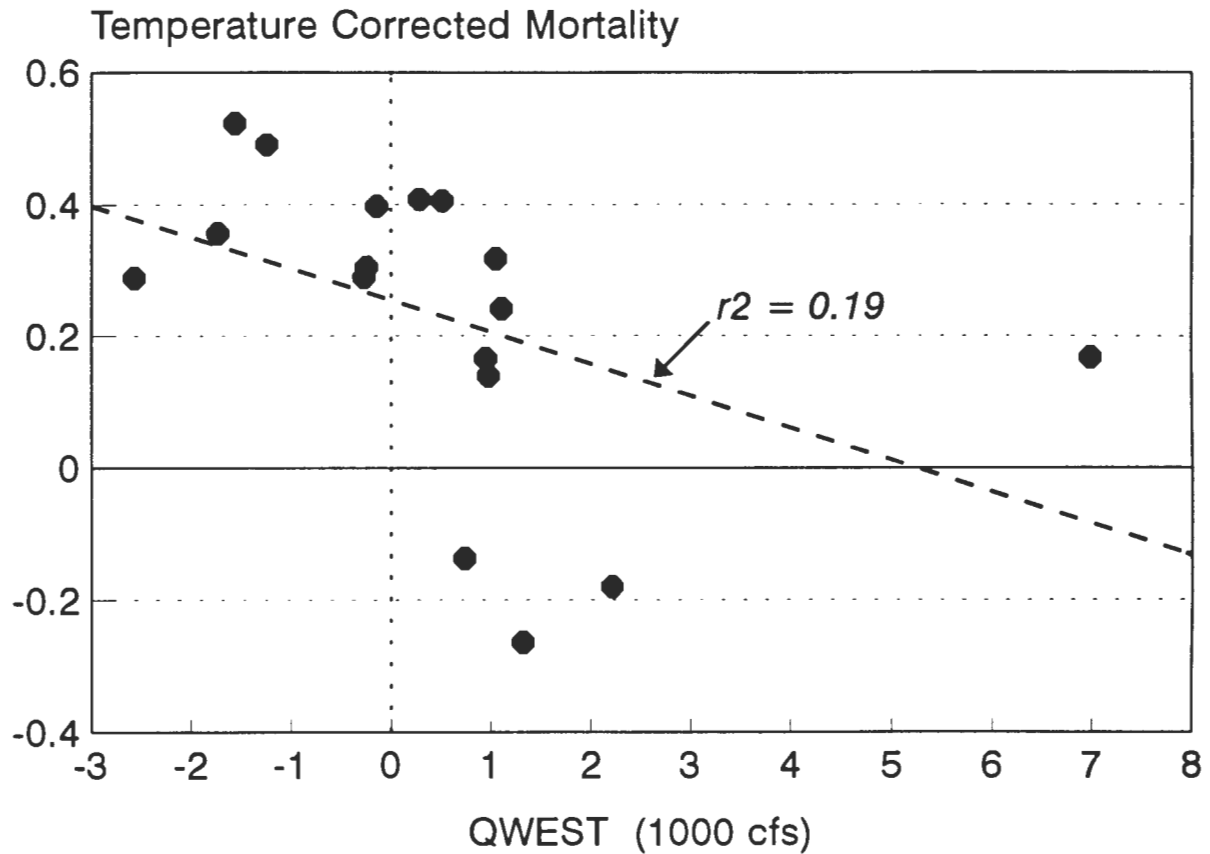


Hourly Outflow at Chipps Island (March 1988)
Fischer Delta Model Simulation
Relative magnitude of QWEST



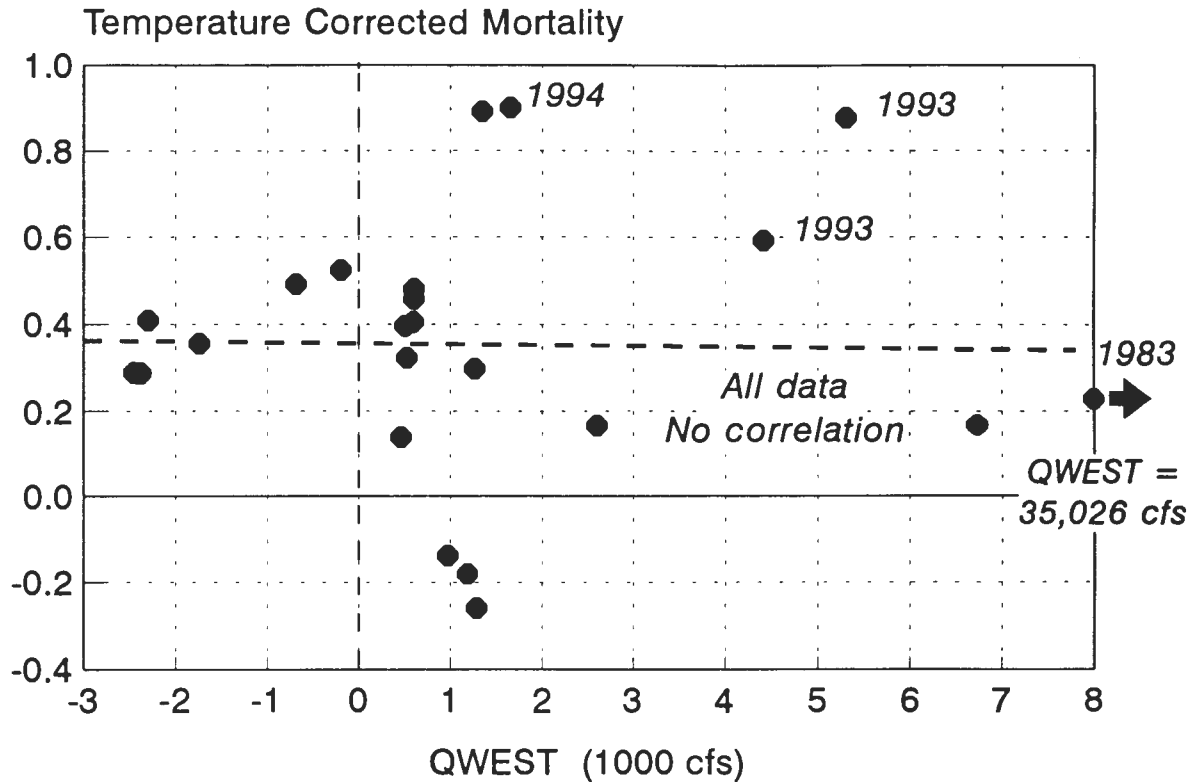
- Hourly tidal variations in flows in the Western Delta typically dwarf any variations in the QWEST index.
- $\pm 350,000$ cfs compared to $\pm 4,000$ cfs

Earlier Data Presentation Ryde Releases 1984-1992



- Flows only averaged over first 5 days of duration of experiment.
- Most recent data not shown.

Mortality versus QWEST Ryde Releases 1983-1994



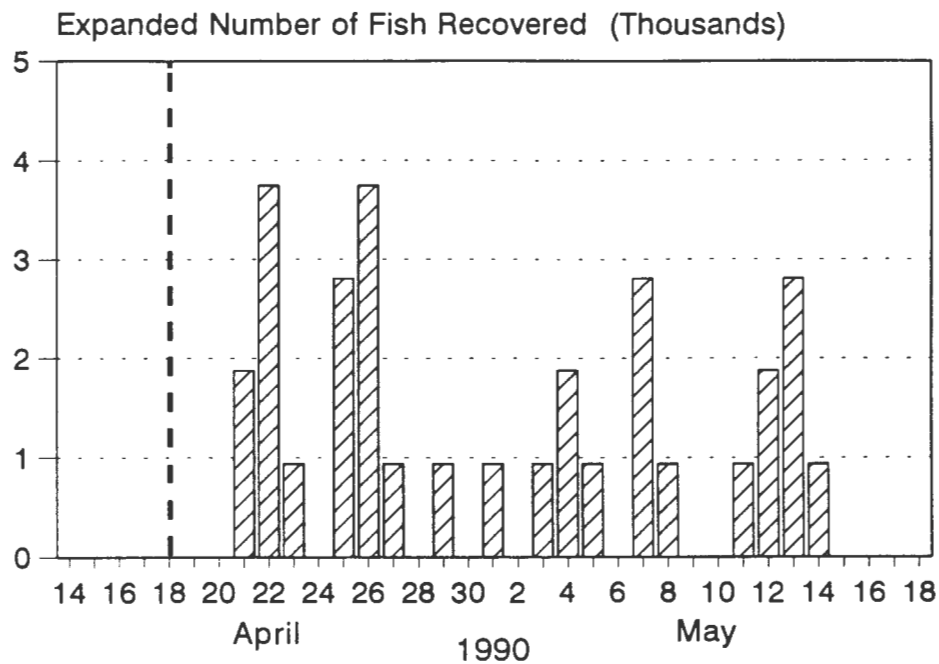
- All data used, 1983-1994
- Flows averaged over full duration of experiment (typically > 14 days)
- Conclusions:
 - Large data scatter.
 - No correlation.
 - Some experiments show decrease in survival as QWEST increases.

Correlation With QWEST Dependent Upon Choice Of Averaging Period

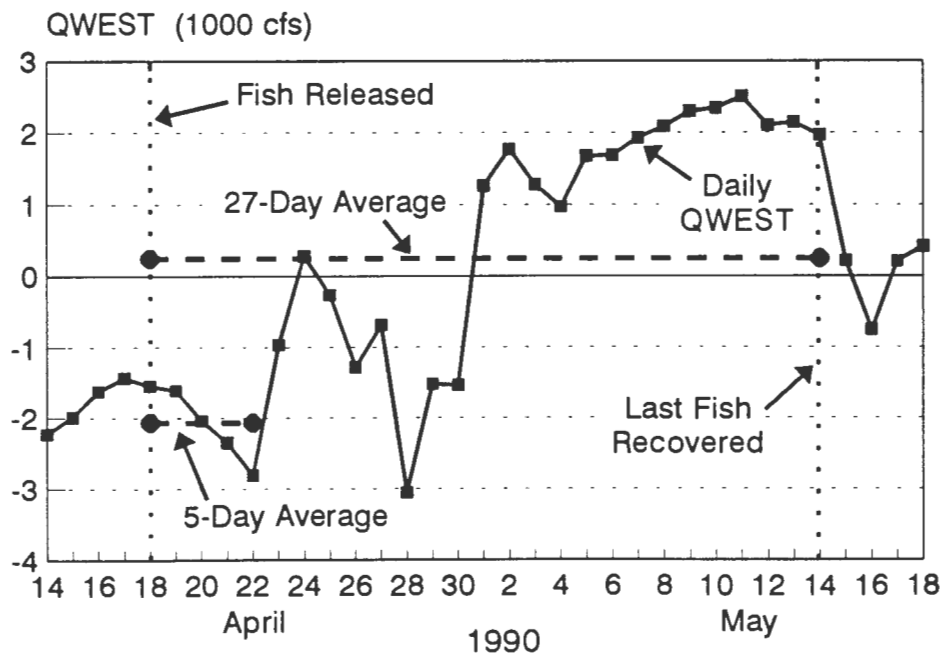
- Five day averaging period for QWEST is too short.
- More representative to average QWEST over the complete duration of the experiment.
- The last fish were often recovered up to a month after release.
- Fish that reach Chipps Island rapidly less likely to have been affected by flow than fish arriving later or those that never arrived.

1990 Jersey Point Coded-Wire Tag Recoveries

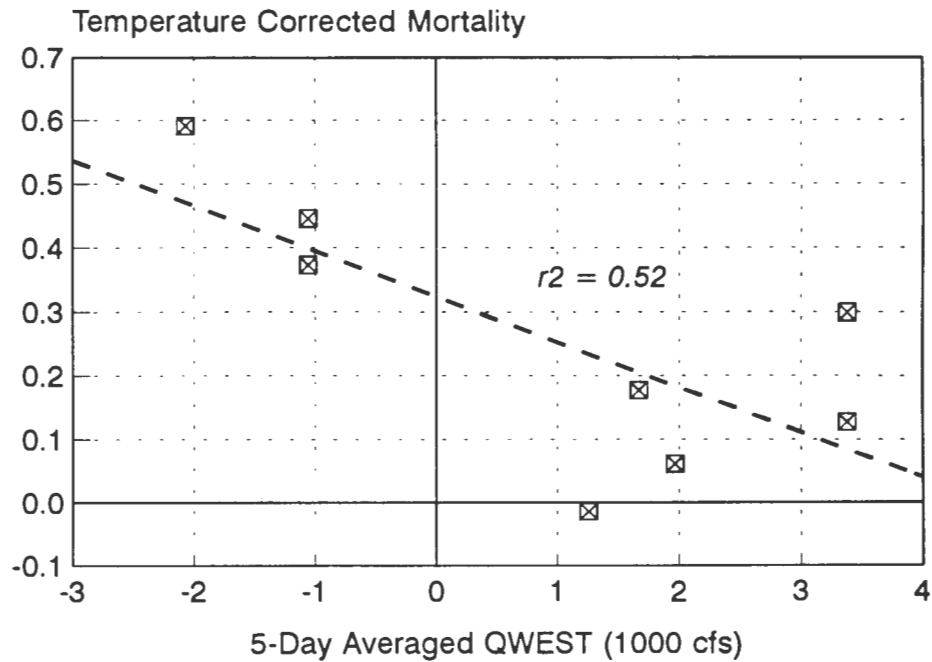
Released on April 18, 1990



Variation in QWEST during a Smolt Survival Experiment

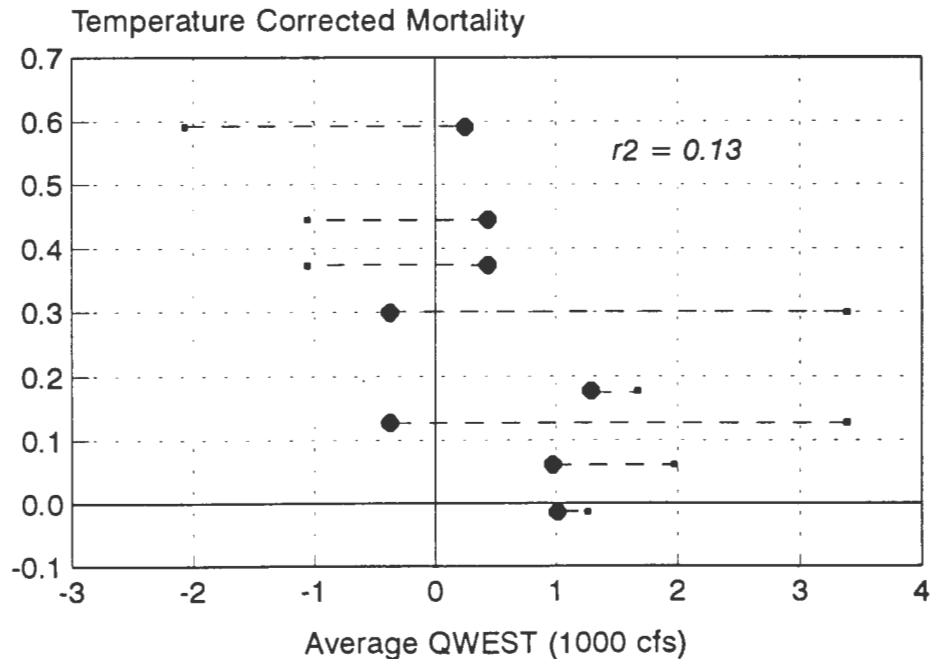


Earlier Data Presentation
Jersey Point Releases 1989-1991

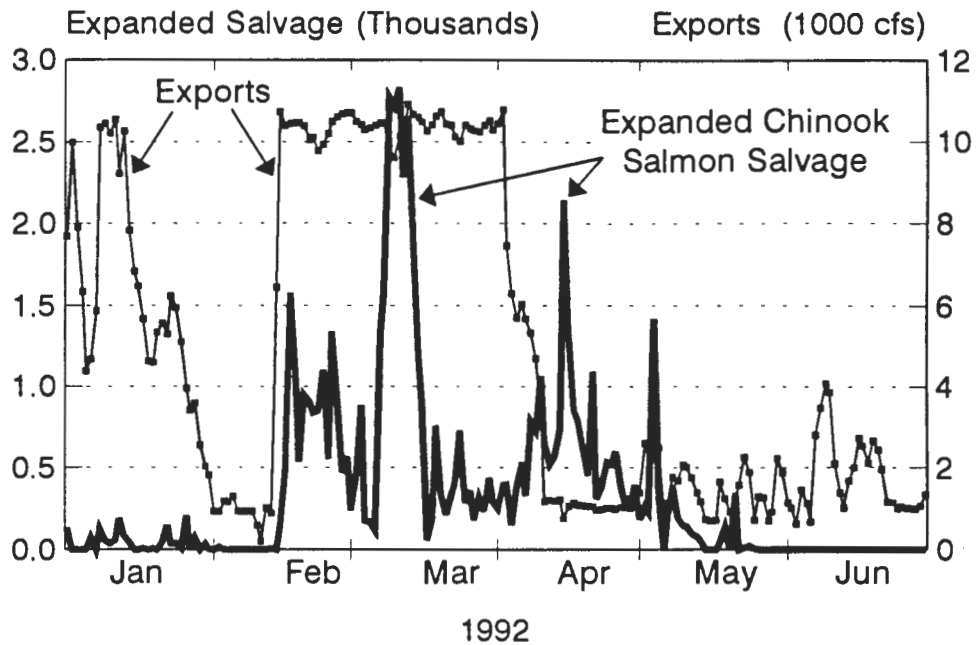


Mortality versus QWEST
Jersey Point Releases 1989-1991

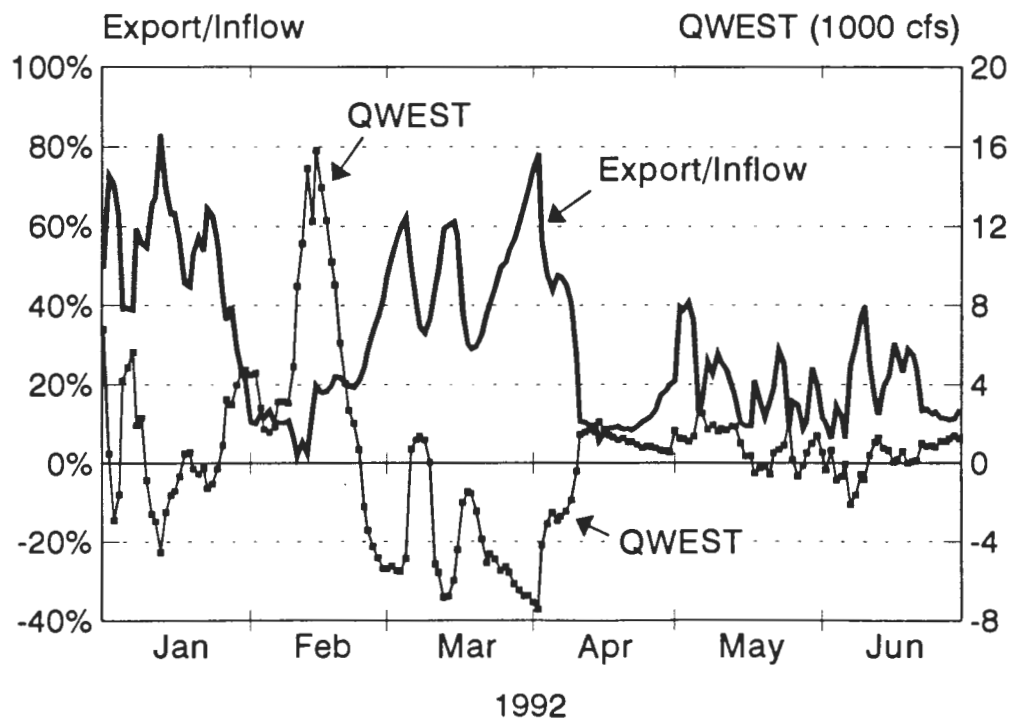
QWEST averaged from day of release till last fish caught.



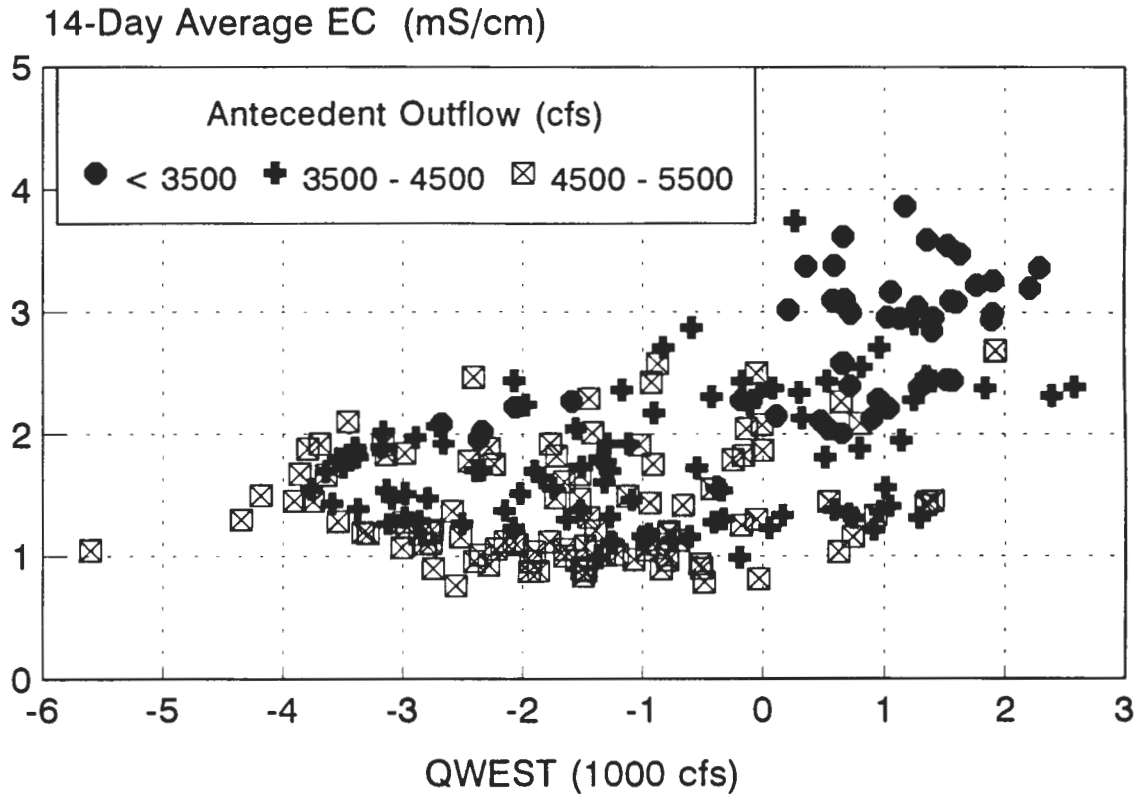
Combined Salvage of Chinook Salmon and Exports at Banks and Tracy January-June, 1992



QWEST and Export/Inflow Ratio January-June, 1992



Jersey Point Electrical Conductivity 1968-1990



- No basis for assuming "salt cues" for outmigrating fish.
- No discernable trend in salinity with QWEST.

Additional Problems with QWEST

- Incompatible with desire to have a San Joaquin component to X2 (e.g. Delta smelt biological opinion):
 - ▶ QWEST limits mean that any increase in San Joaquin flow can be pumped.
- QWEST limits mean that more can be exported when the cross-channel is open than when the cross-channel is closed.

Joint Ag-Urban Proposal Comprehensive Plan Export Limits

- Habitat Measures
 - ▶ February-June: X2
 - ▶ July-January: Minimum Flows

- Export Levels
 - ▶ Entrainment reductions:
 - Largest reductions when entrainment highest
 - Relaxations when entrainment lowest

- Barriers
 - ▶ Physical and acoustic
 - ▶ Maintain migrating species in high survival channels

- Non-flow factors

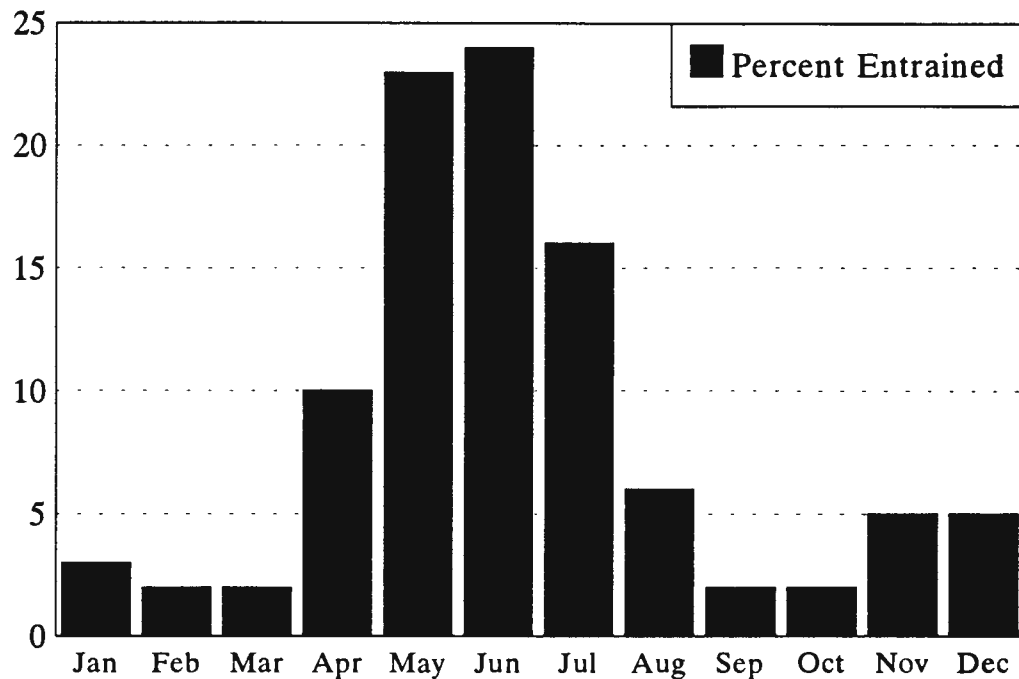
- Monitoring

Joint Ag-Urban Proposal

- Export Limits -

- Reduce exports to reduce entrainment
- Correspond to earlier levels
- Sliding Scale Concept
 - ▶ Base exports on inflow
 - ▶ Lower when inflows low
 - ▶ Higher when inflows high
- Relate to other actions
 - ▶ X2 or outflow levels
 - ▶ Barriers
- Relaxations when effects on fish populations are minimal

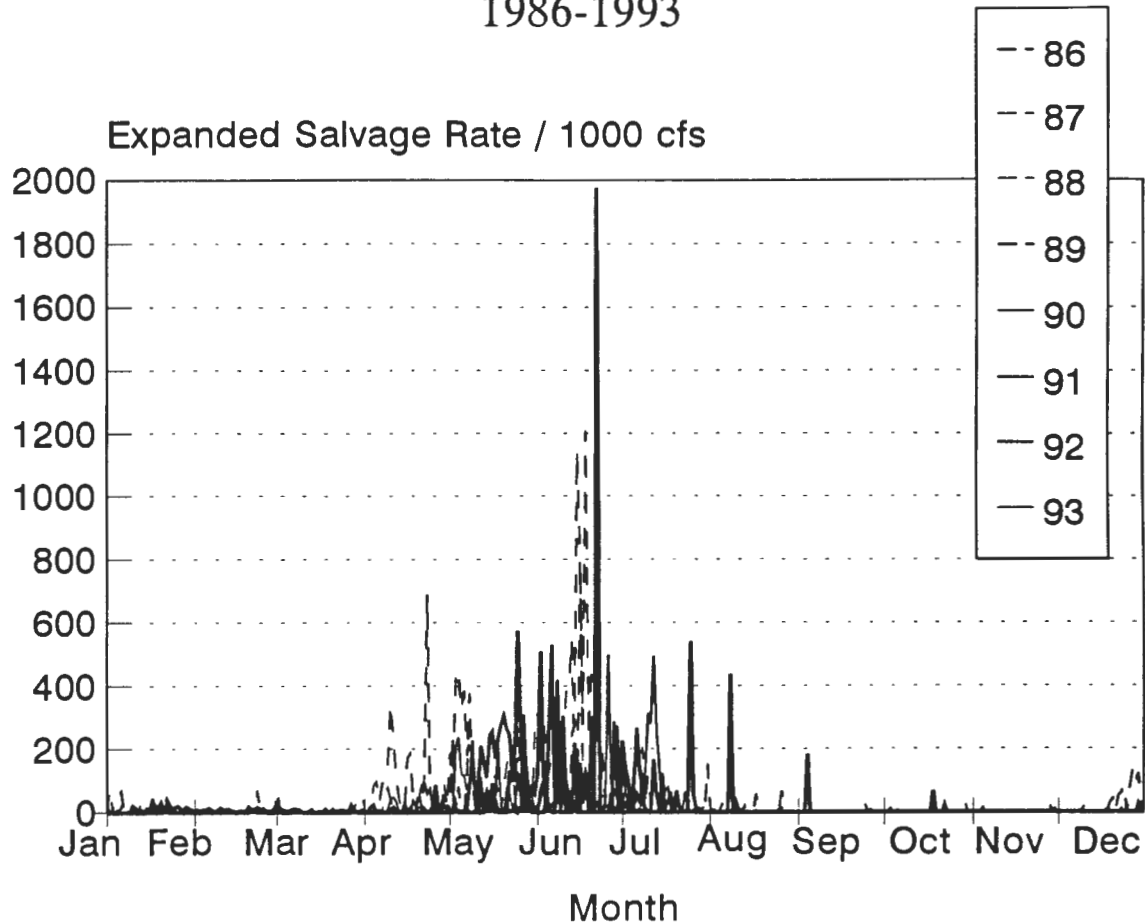
Historical Fish Entrainment Salmon, Smelt, Splittail, Shad, Bass



Source: Biological Explanation, Page 2-21

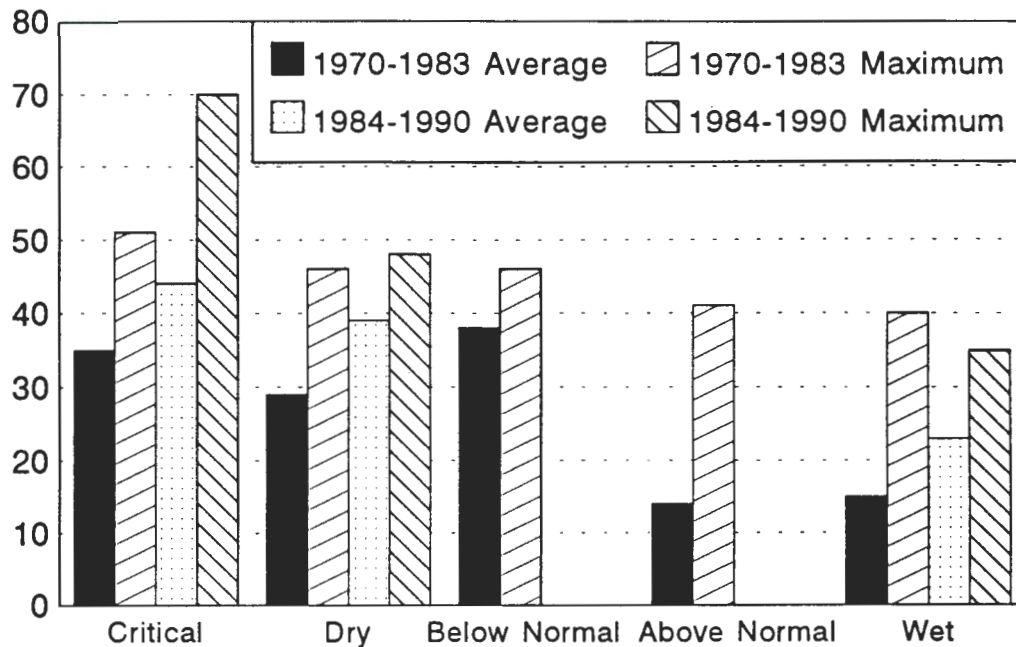
- Highest entrainment:
March - August
- More than 70% entrained:
April - July
- Keep highest protection:
March - July
- Continue protection in summer:
to prevent loss of prior gains
- Relaxation during low
entrainment periods

Delta Smelt 1986-1993



- Highest entrainment: April - July.
- Keep highest protection April - July.
- Continue protection in summer to prevent loss of prior gains.

Historical Exports Percentage Exported March - June



Source: Biological Explanation, Page 2-20

- Percentage diverted increased with time.
- Diversions increased inversely to water supply.
- Target level: 35% based on historical levels.
- Further improvement: 30% relaxations to 35% if fish distributed away from pumps

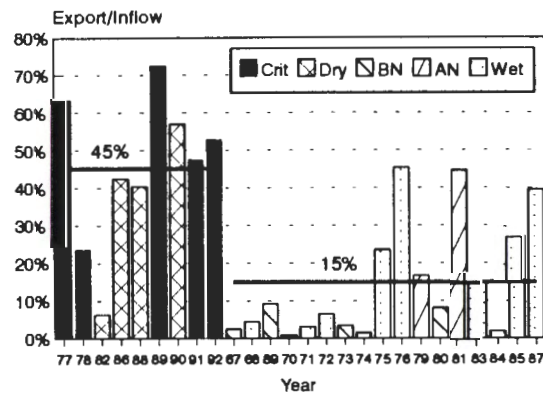
Joint Ag-Urban Proposal

Export Limits

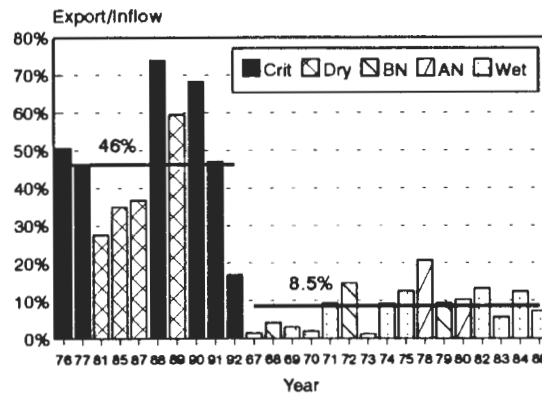
Relationship With Other Measures

- Habitat improvement:
 - ▶ X2: February - June.
 - ▶ Outflows: May - January.
- X2/Spring export limits
 - ▶ Confluence: Exports \approx 3000 cfs.
 - ▶ Chipps Island: Exports \approx 5000 cfs.
 - ▶ Roe Island: Exports \approx 12,000 cfs.
- Barriers: Cross-channel closures
 - ▶ February - May.
 - ▶ November - January.
- Barriers: Head of Old River
 - ▶ April 15 - May 15.
 - ▶ Fall pulse flow.
- Additional export limits:
 - ▶ April 15 - May 15.
 - ▶ No more than San Joaquin inflow.
- Non-flow related measures.
- Enhanced monitoring program.

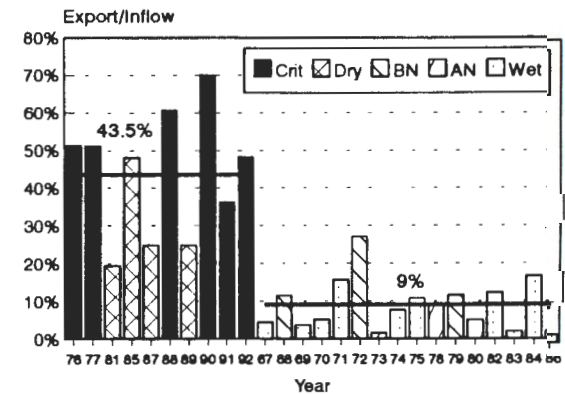
Historical Export/Inflow Ratio
January (1967-1992)



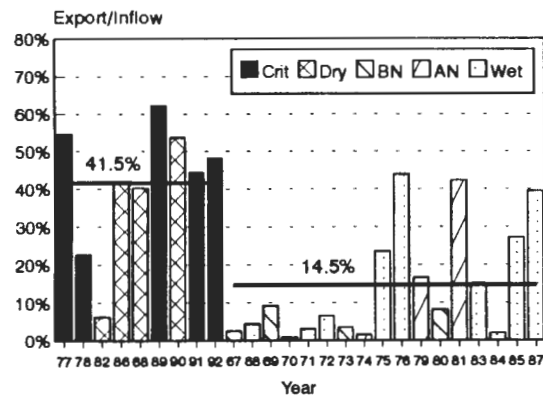
Historical Export/Inflow Ratio
February (1967-1992)



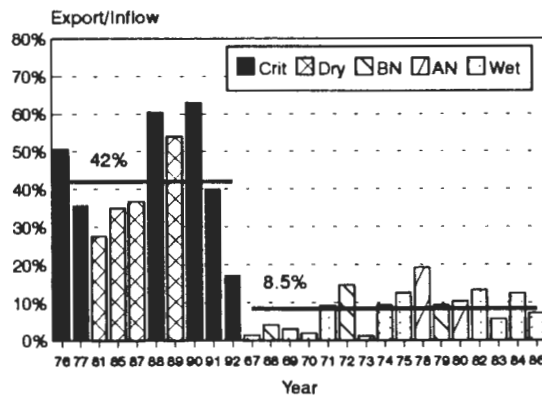
Historical Export/Inflow Ratio
March (1967-1992)



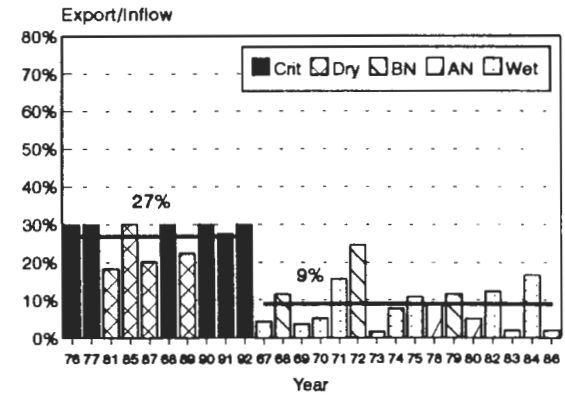
Export/Inflow Ratio with Water Users Proposal
January (1967-1992)



Export/Inflow Ratio with Water Users Proposal
February (1967-1992)

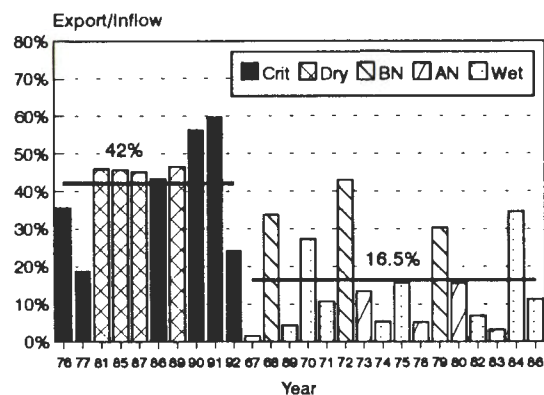


Export/Inflow Ratio with Water Users Proposal
March (1967-1992)

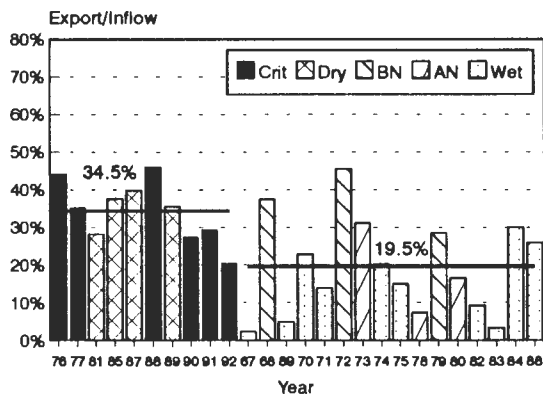


January, February and March Export/Inflow Ratios

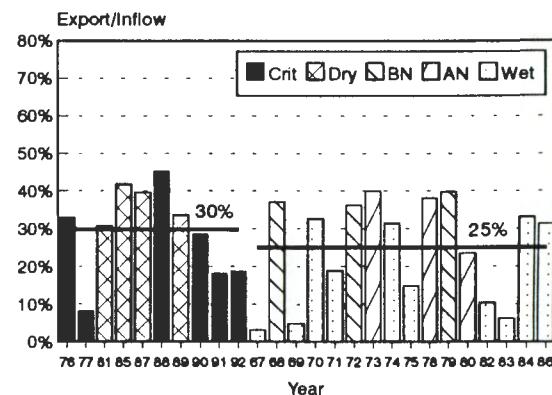
Historical Export/Inflow Ratio
April (1967-1992)



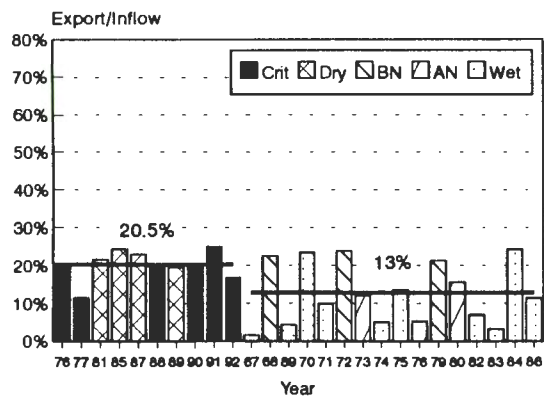
Historical Export/Inflow Ratio
May (1967-1992)



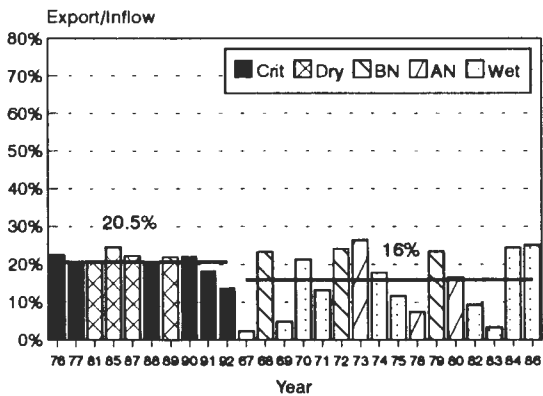
Historical Export/Inflow Ratio
June (1967-1992)



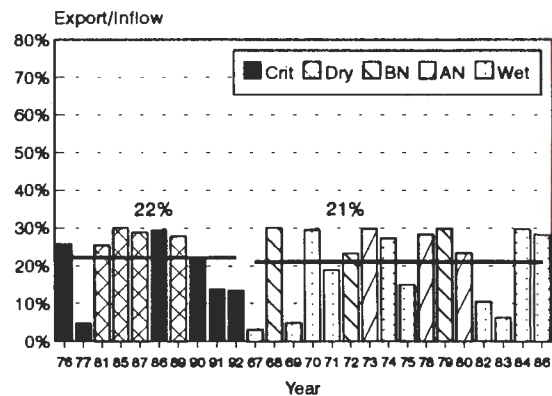
Export/Inflow Ratio with Water Users Proposal
April (1967-1992)



Export/Inflow Ratio with Water Users Proposal
May (1967-1992)

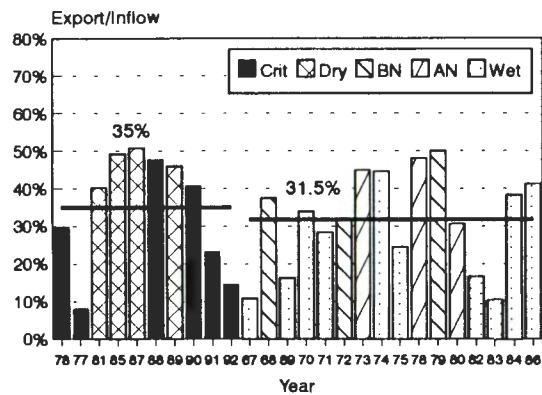


Export/Inflow Ratio with Water Users Proposal
June (1967-1992)

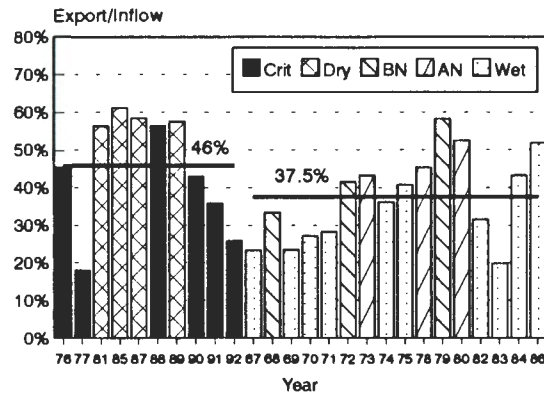


April, May and June Export/Inflow Ratios

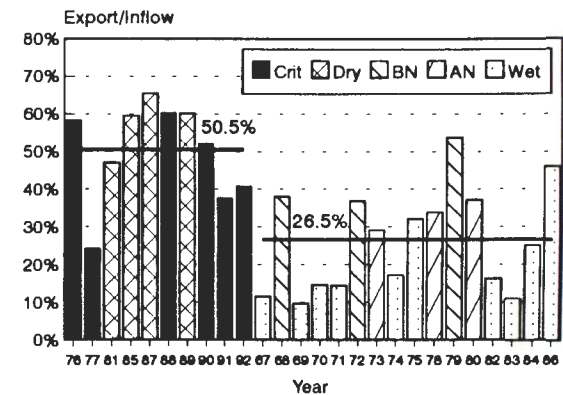
Historical Export/Inflow Ratio
July (1967-1992)



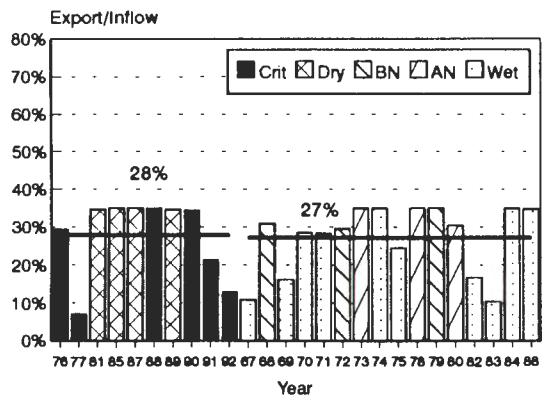
Historical Export/Inflow Ratio
August (1967-1992)



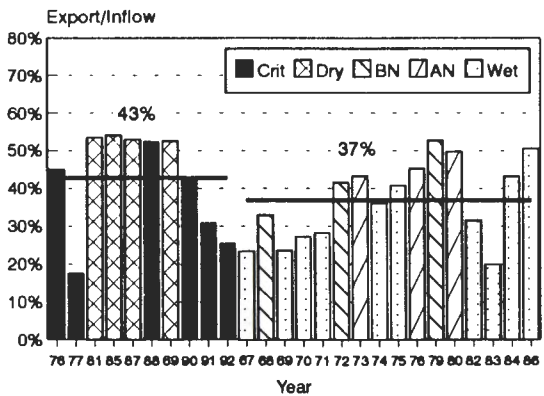
Historical Export/Inflow Ratio
September (1967-1992)



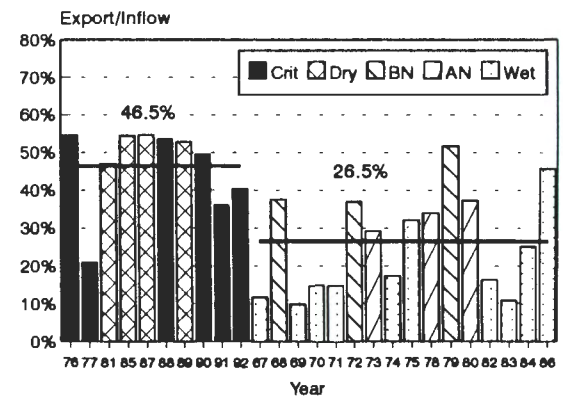
Export/Inflow Ratio with Water Users Proposal
July (1967-1992)



Export/Inflow Ratio with Water Users Proposal
August (1967-1992)

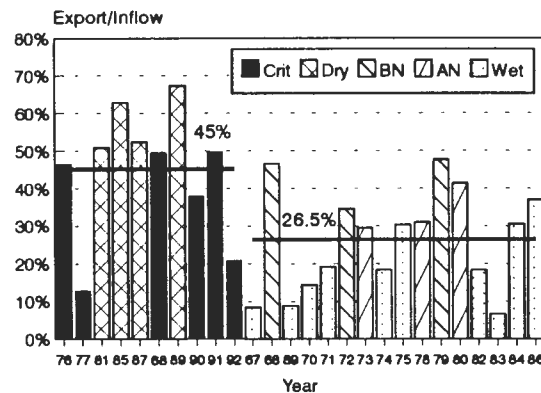


Export/Inflow Ratio with Water Users Proposal
September (1967-1992)

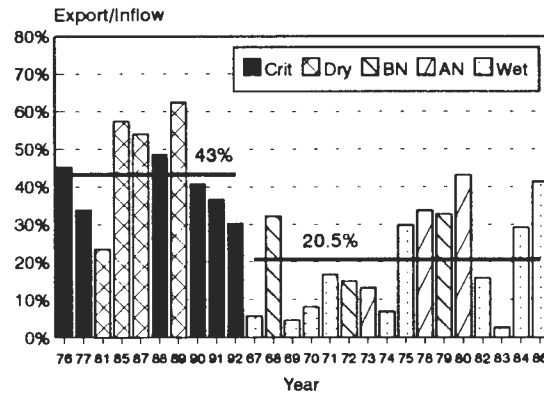


July, August and September Export/Inflow Ratios

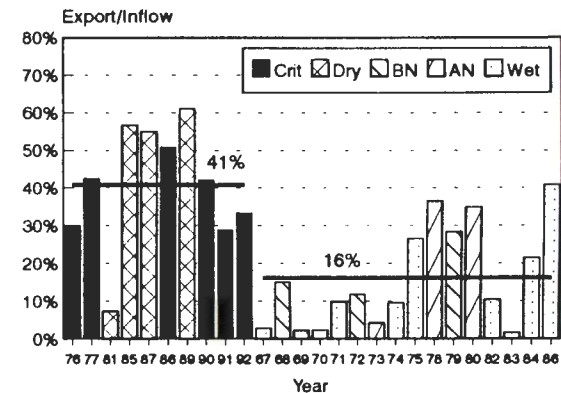
Historical Export/Inflow Ratio
October (1967-1992)



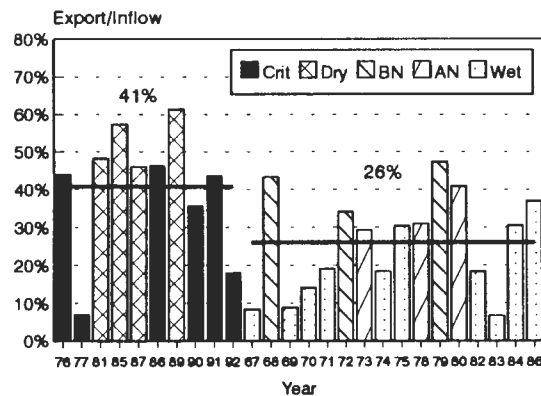
Historical Export/Inflow Ratio
November (1967-1992)



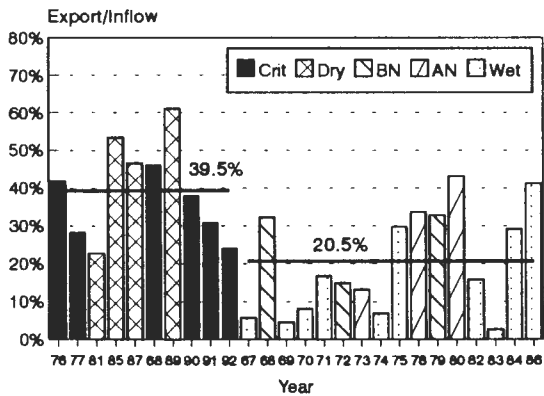
Historical Export/Inflow Ratio
December (1967-1992)



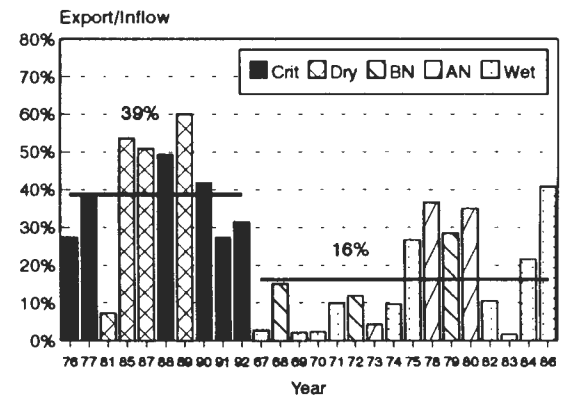
Export/Inflow Ratio with Water Users Proposal
October (1967-1992)



Export/Inflow Ratio with Water Users Proposal
November (1967-1992)

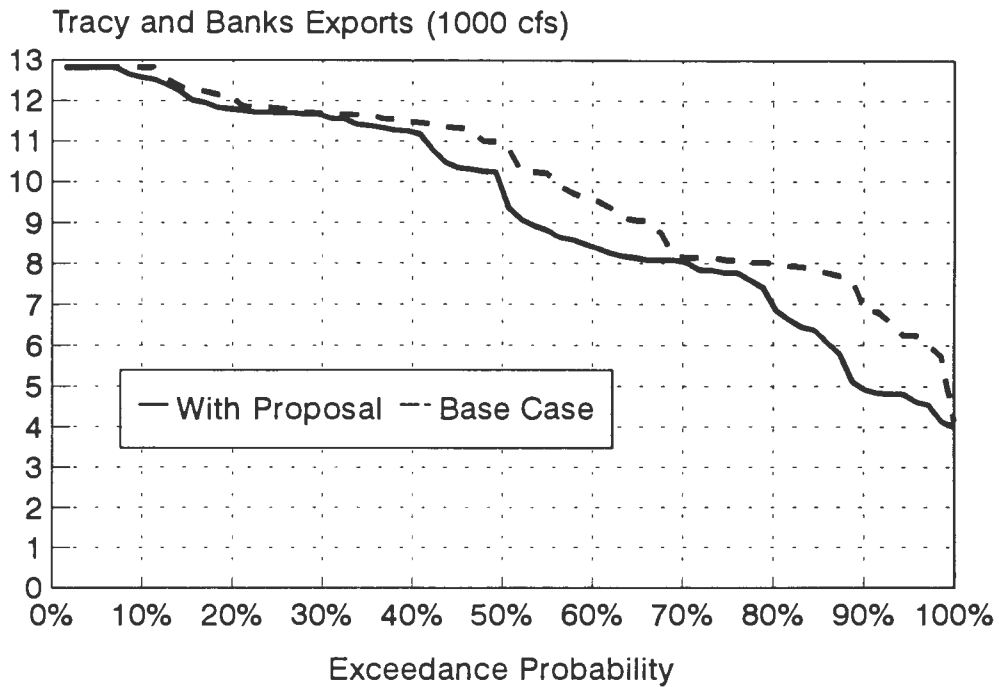


Export/Inflow Ratio with Water Users Proposal
December (1967-1992)

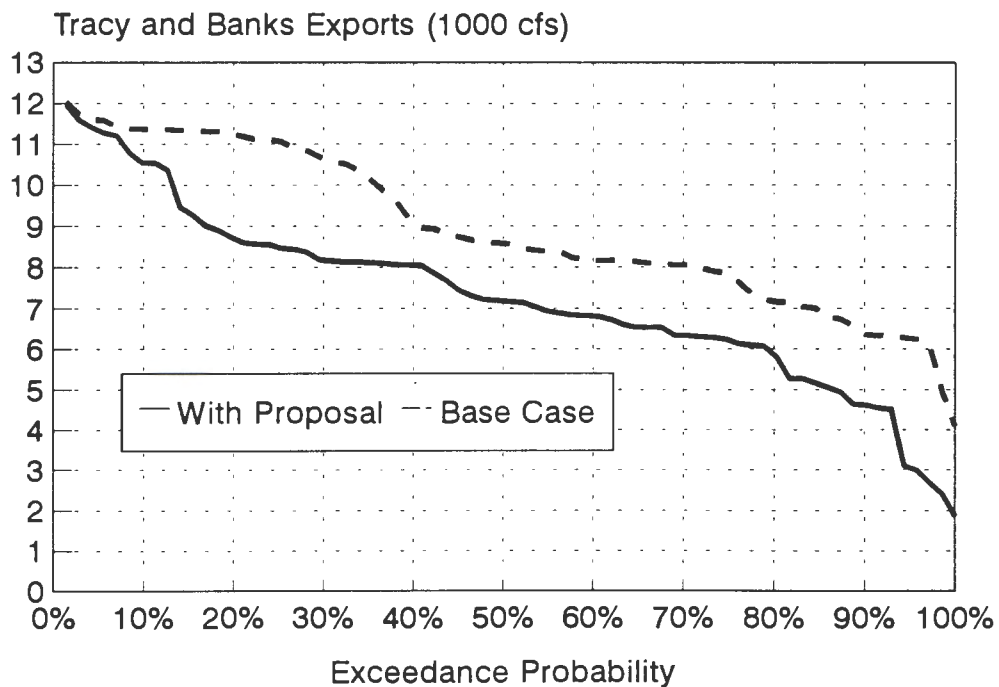


October, November and December Export/Inflow Ratios

Tracy and Banks Pumping
DWRSIM 1922-1992
February



Tracy and Banks Pumping
DWRSIM 1922-1992
March



**Joint Ag-Urban Proposal
Export Limits
Correspondence with San Joaquin Measures**

- **Barriers: Head of Old River:**
April 15 - May 15
- **Additional Export Limits:**
 - ▶ April 15 - May 15
 - ▶ No more than San Joaquin inflow
- **USGS field data, Barrier out:**
80 to 85% of flow from north
15 to 20% of flow from San Joaquin
(15% if exports HIGH, 20% when LOW)
- **USGS field data, Barrier in:**
100% of flow from North
- **Conclusion:** Except in a few very wet years, Ag-Urban proposal compensates for flow changes due to barrier with export reductions.

Joint Ag-Urban Proposal Export Limits Conclusions

- Ecosystem Approach:
 - ▶ Consider entire year.
 - ▶ Consider all native species.
 - ▶ Consider other actions.
- Exports limited to reduce entrainment.
- Exports limited to correspond to earlier period.
- Export limits relaxed when effects are minimal.
- Export limits related to other activities.

Joint Ag-Urban Proposal Comprehensive Plan Export Limits

- Habitat Measures
 - ▶ February-June: X2
 - ▶ July-January: Minimum Flows
- Export Levels
 - ▶ Entrainment reductions:
 - Largest reductions when entrainment highest
 - Relaxations when entrainment lowest
- Barriers
 - ▶ Physical and acoustic
 - ▶ Maintain migrating species in high survival channels
- Non-flow factors
- Monitoring

Joint Water User Proposal

Bay-Delta Comprehensive Protection Plan

December 1994

Admin Record
Submitted at
Rietz/
Periancy-
Mehing
Monkey
12/01/94

Areas of Discussion

- Agencies Supporting Proposal
- Overall Objectives
- Basics -- How the System Works
- Biological Benefits
- Managing a Variable Water Supply
- How We Have Addressed Key Issues
- Basis For:
 - Proposed Export Limits
 - Proposed X2 Salinity/Outflow Standard
 - Proposed San Joaquin Flows
 - Proposed Category III
 - Proposed Monitoring & Evaluation Program



Agencies Supporting the Joint Proposal



➤ State Water Contractors -- 29 agencies including:

- Kern County Water Agency
- Tulare Lake Basin Water Storage District
- Metropolitan Water District of Southern California

➤ California Urban Water Agencies -- 11 agencies including:

- San Francisco P.U.C
- Contra Costa Water District
- East Bay Municipal Utility District
- Los Angeles Water & Power
- San Diego County Water Authority

➤ San Luis Delta Mendota Water Authority -- 39 agencies including:

- Westlands Water District
- Santa Clara Valley Water District

These agencies serve over 2/3 of the State's population

Technical Personnel Contributing to the Joint Proposal

Elaine Archibald
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Lyle Hoag
Roger James
Laura King
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-- Beak Consultants, Inc.
-- Buell & Associates
-- Contra Costa Water District
-- Consultant
-- Contra Costa Water District
-- R2 Resource Consultants, Inc.
-- Hanson Environmental
-- Morrison & Foerster
-- California Urban Water Agencies
-- Santa Clara Valley Water District
-- East Bay Municipal Utility District
-- State Water Contractors
-- Consultant
-- East Bay Municipal Utility District
-- Consultant
-- Contra Costa Water District
-- Metropolitan Water District
-- R2 Resource Consultants, Inc.

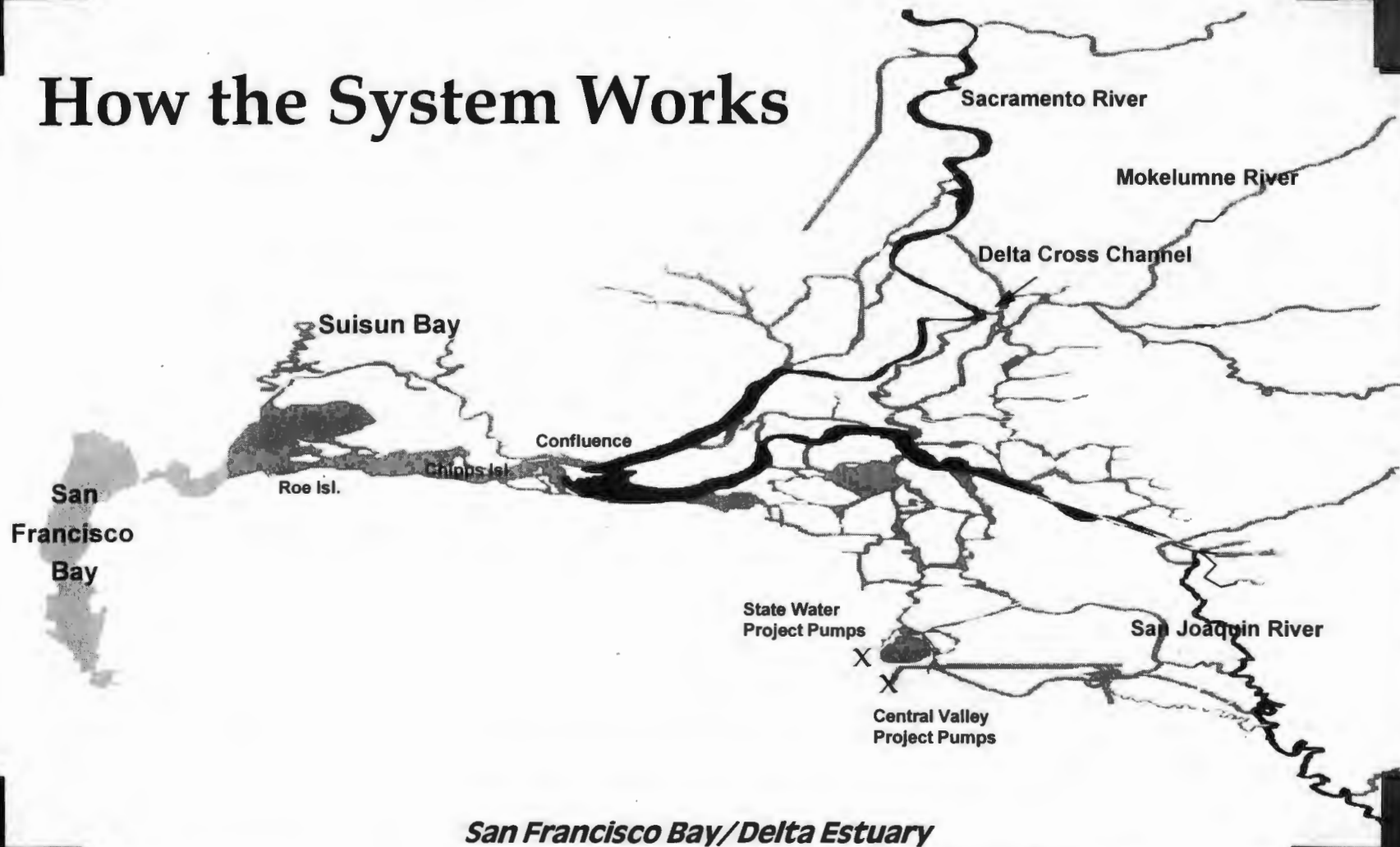
Dudley Reiser, Ph.D.
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Daniel Steiner
Lena Tam
Walt Wadlow

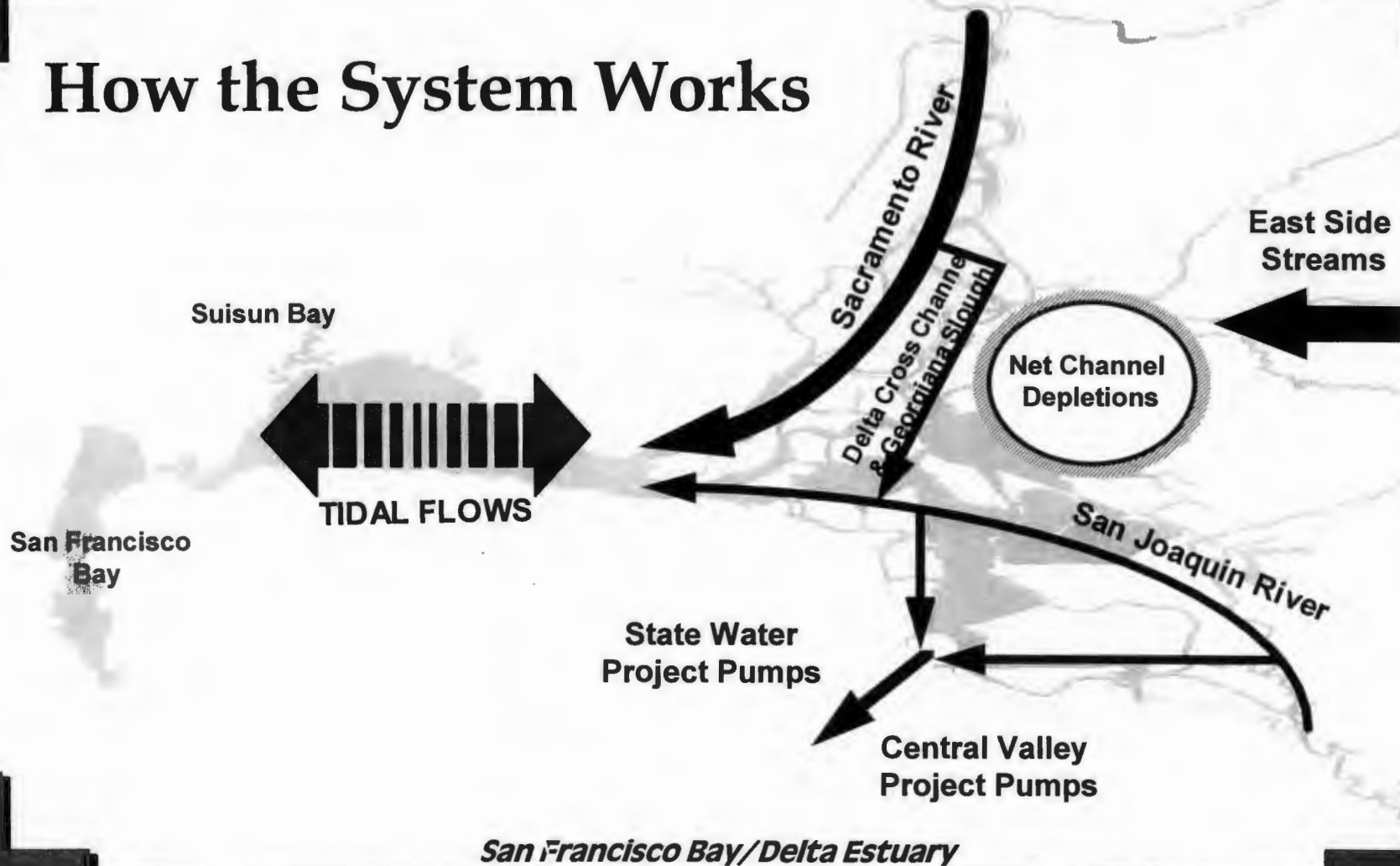
-- R2 Resource Consultants, Inc.
-- Metropolitan Water District
-- Kronick, Moskovitz, Tiedemann &
Girard
-- Consultant
-- Consultant
-- East Bay Municipal Utility District
-- Santa Clara Valley Water District



How the System Works



How the System Works



Overall Objectives of the Joint Proposal

- Develop a comprehensive environmental protection program
- Eliminate uncertainties associated with action under the ESA
- Improve the estuary by addressing overall habitat quality
- Achieve a stable & reliable water supply
- Address non-outflow related factors affecting species viability
- Provide funding for physical habitat improvement & non-outflow related measures
- Develop a comprehensive evaluation & monitoring plan



Proposed Coordinated Estuarine Protection Program

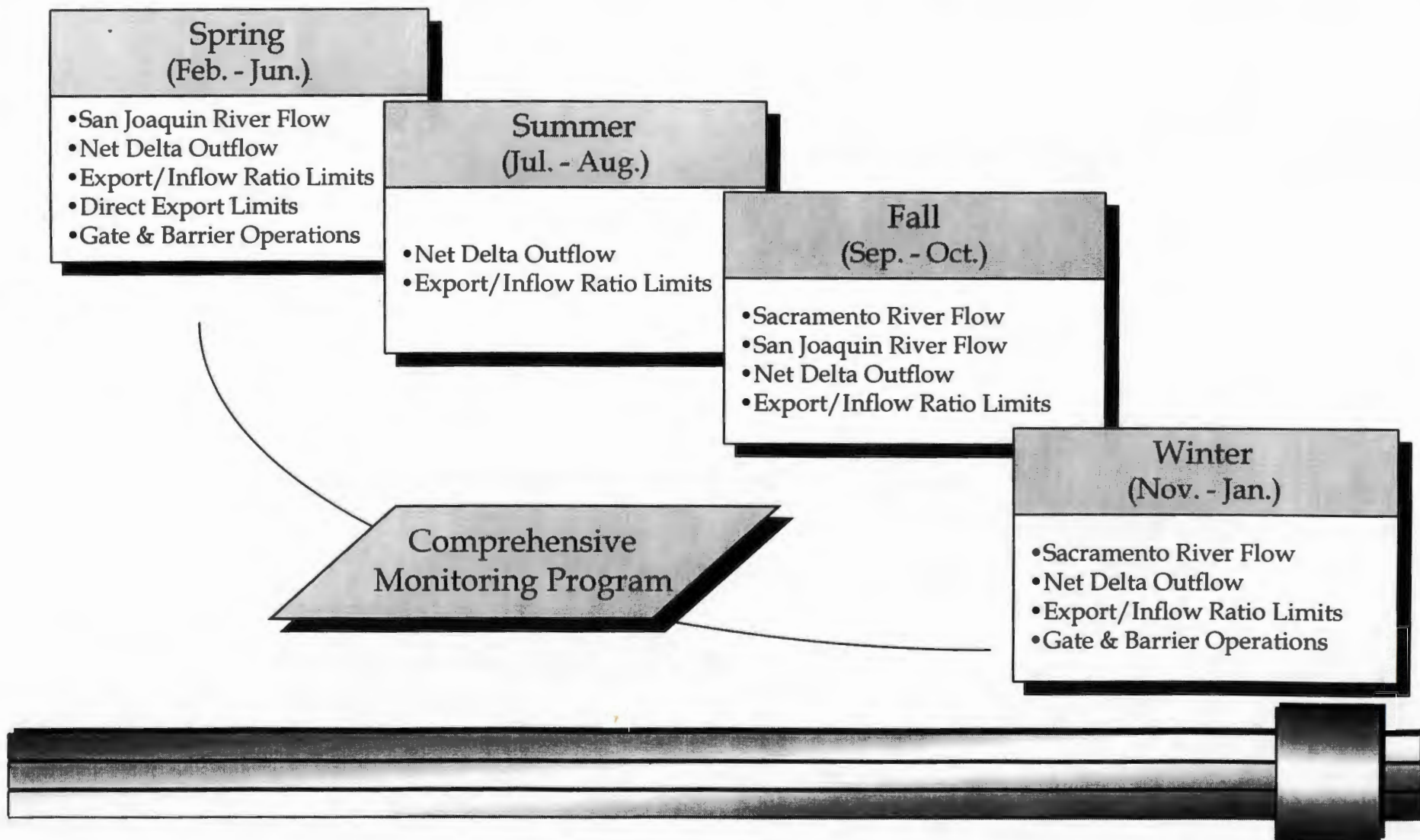
- **Category 1: Estuarine Habitat Protection Standard**
 - Modified X2 Salinity Standard (For Spring period only)
- **Category 2: Multi-Species Management Measures**
 - Flow (For Summer, Fall, & Winter periods)
 - Operational (Export constraints, X-channel closure, etc.)
- **Category 3: Non-Outflow Factors & Restoration Measures**
 - Toxics, exotic species, unscreened diversions, poaching, etc.
 - Near-term physical habitat & fish transport improvement measures
- **Category 4: Implementation Measures**



Biological Benefits of the Joint Proposal

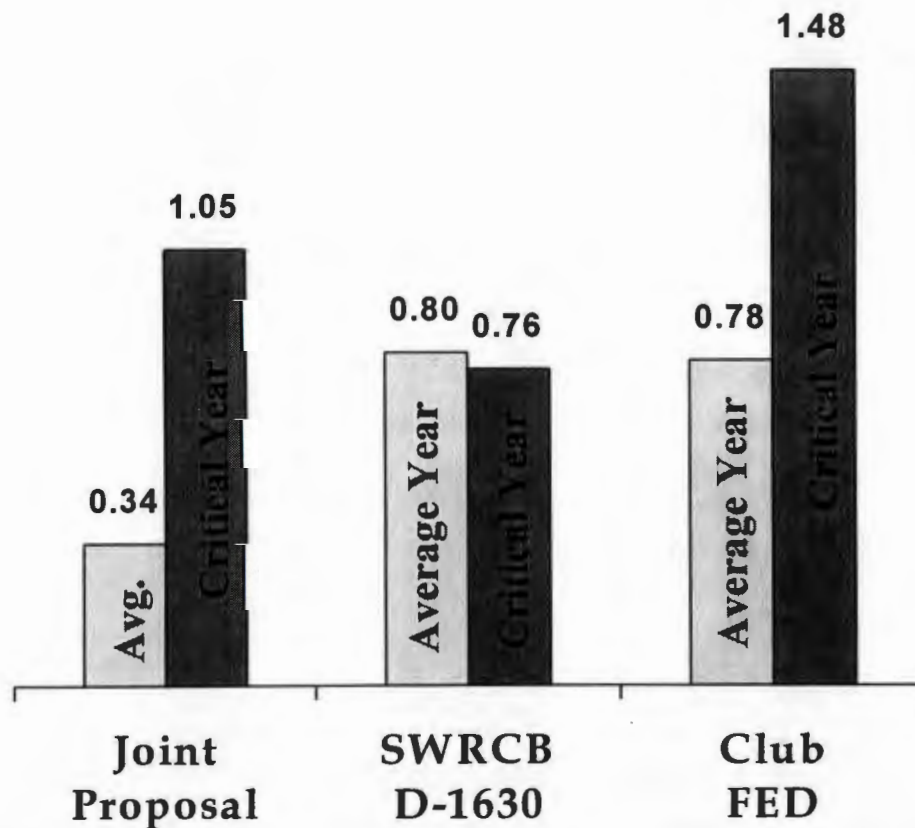
	Club FED Proposal	Joint Proposal
Increased instream flows	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Improved estuarine habitat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reduced fish entrainment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fish transport flows	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring and response program	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Physical habitat restoration	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Programs for unscreened diversions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Programs for pollution control	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Programs for other non-outflow related factors	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Regulatory Parameters of the Joint Proposal



Managing a Variable Water Supply

(Impacts in millions of acre-feet)

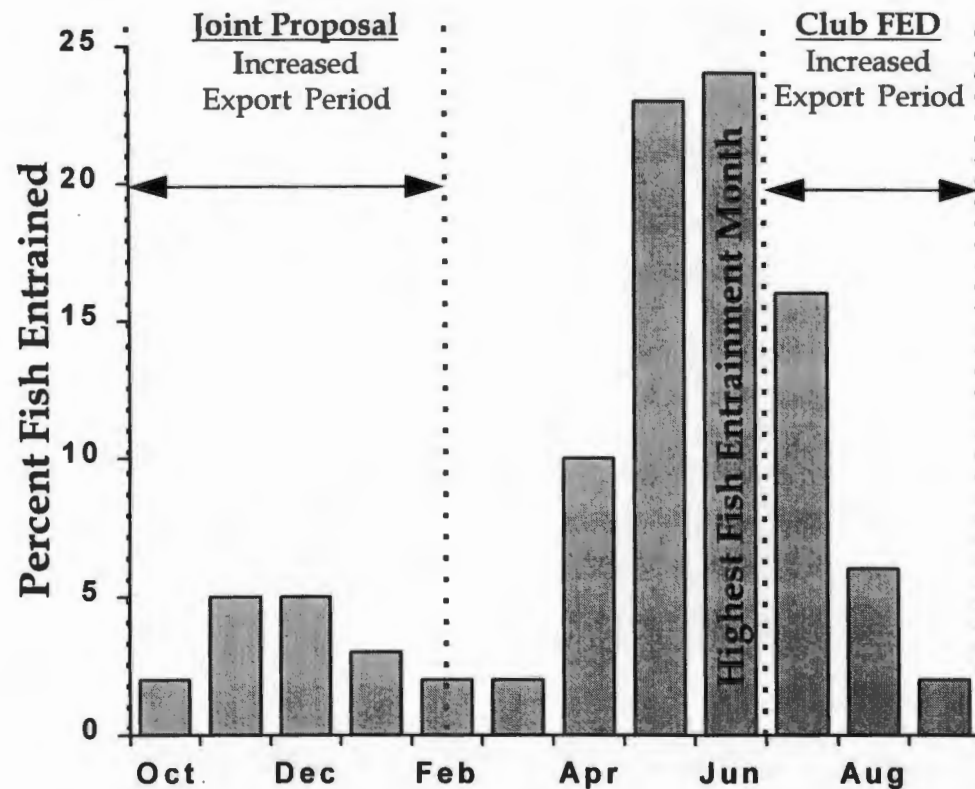


Benefits of Joint Proposal:

- Provides additional drought year outflow to increase environmental protection during critical fish migration periods.
- Allows the State to better manage an average year water supply to increase reliability (shelf-life)
- Increases transport flows and low-salinity habitat.
- Reduces fish entrainment at the federal/state export facilities

Basis for Proposed Export Limits

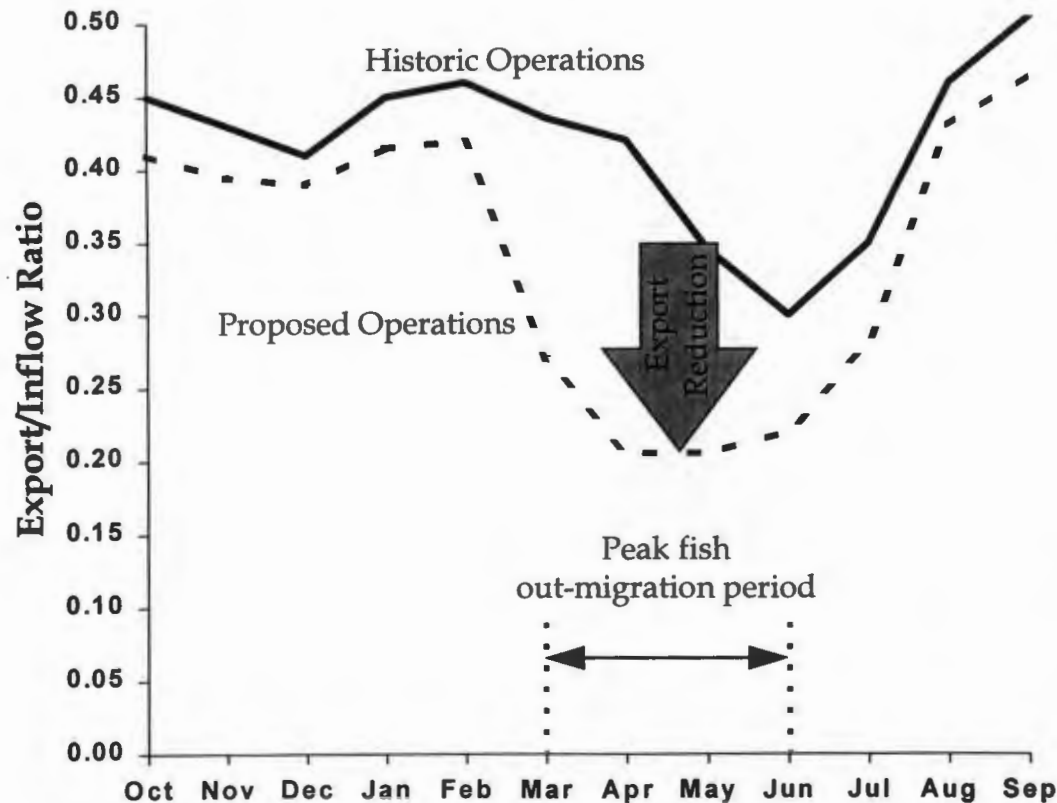
Proposed Shift in Exports to Reduce Entrainment



Benefits of Joint Proposal:

- Increased exports outside of high fish entrainment period
- Exports reduced during critical fish out-migration periods
- Export limits related to fish guidance barriers & other measures
- Export/inflow ratio based on sliding scale concept (when flow & habitat conditions improve -- exports increase)

Proposed Export Reductions During Peak Out-Migration & Other Periods



Benefits of Joint Proposal:

- Overall improvement over historic conditions.
- Significant improvement during the peak fish out-migration periods.
- Significant increases in low-salinity fishery habitat during peak out-migration periods.
- Winter protection for early spawning fish.
- Continued protection during Summer months to prevent loss of juvenile fish.
- Shift of exports to non-peak migration periods.

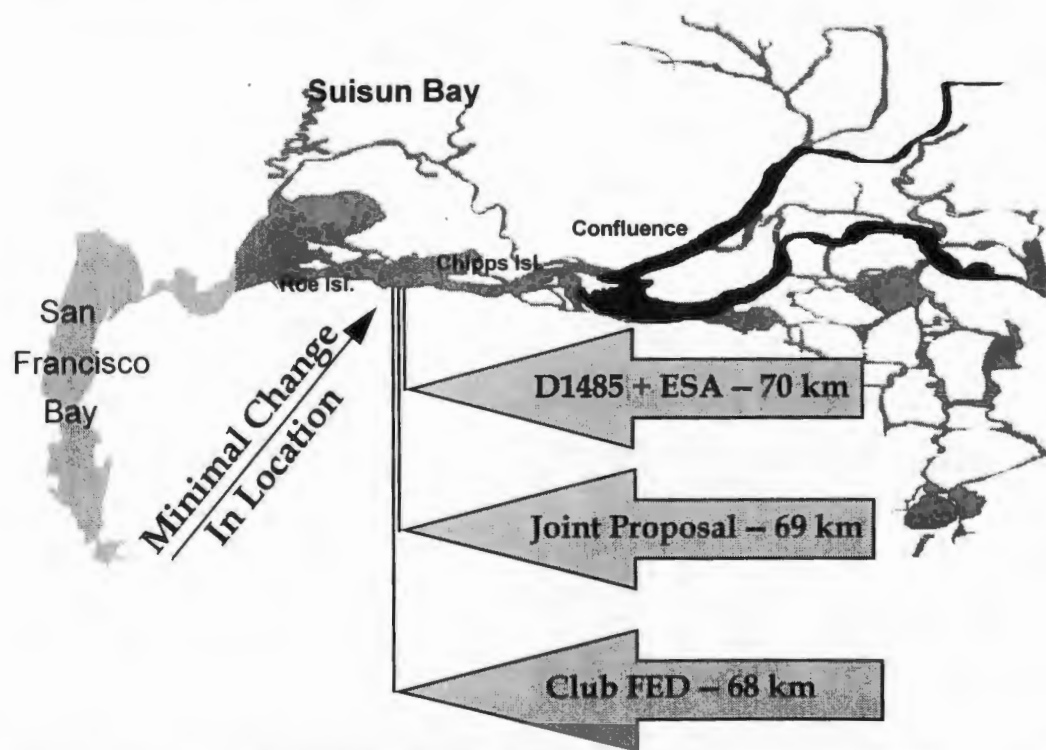
How We Have Addressed Key Issues

- X2 Salinity/Outflow Standard
 - Added Roe Island compliance location
 - Meets the Confluence compliance location for a majority of the peak out-migration period
- Cross-Channel Gate Closure Period
 - Added 30-day closure from November - January
 - Analyzing additional closures based on monitoring through June 15
- State & Federal Project Export Limits
 - Analyzing reducing export/inflow ratio in February based on monitoring
 - Analyzing impacts of export/inflow ratio based on running average
- San Joaquin River Spring Flows
 - Analyzing possibility of water purchases through CVPIA fund to provide additional flows



Basis for Proposed X2 Salinity Standard

Differences in Average February - June 'X2' Location

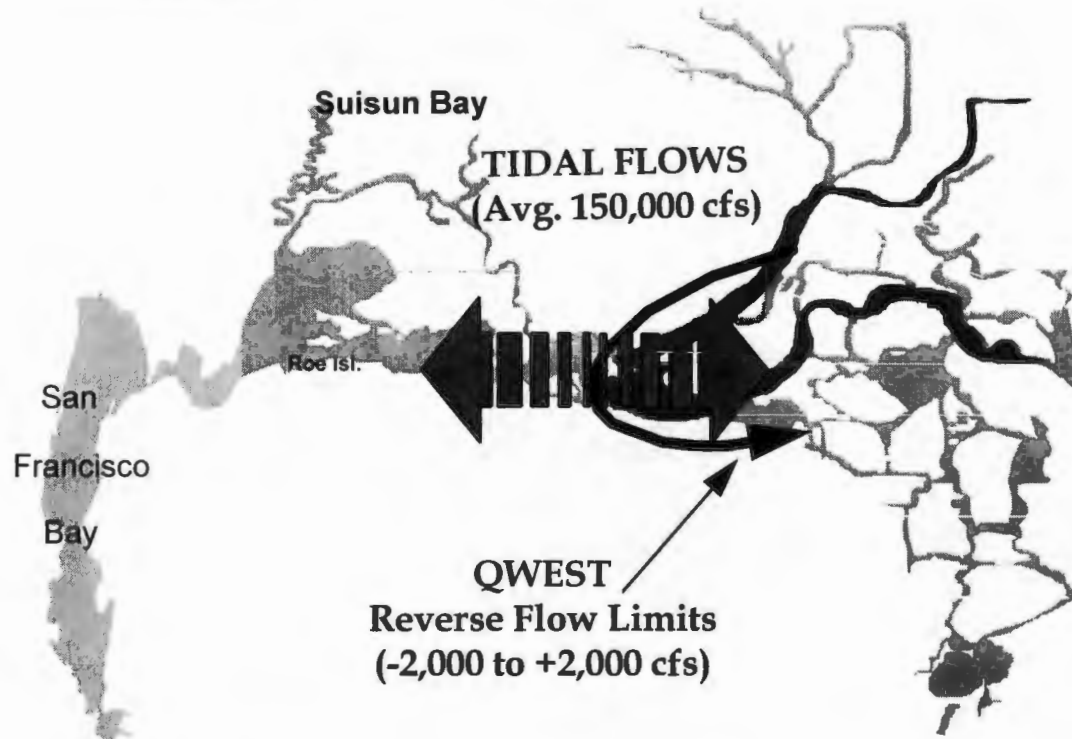


Benefits of Joint Proposal:

- Minimal change in average X2 position but corresponding water supply savings

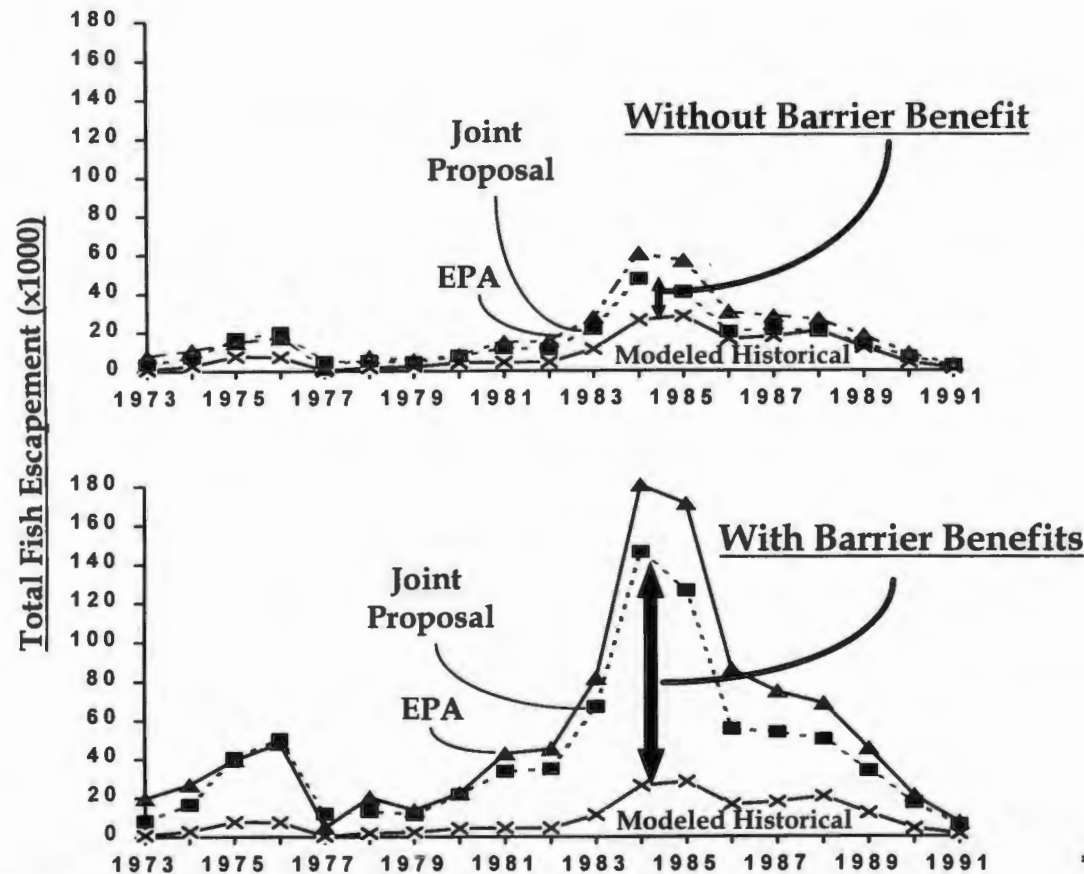
Effects of Tidal Flows on QWEST

Tidal Flows vs. QWEST Reverse Flows



- Tidal flows overwhelm net reverse flows.
- QWEST is a calculated figure -- not representative of what is experienced by the fish.
- Current fluctuations do not impose a significant impediment to salmon smolt migration.

Basis for San Joaquin Outflows



Benefits of Joint Proposal:

- Significant benefits derived from Old River barrier installation
- Additional benefits occur due to San Joaquin flow
- Provides fall spawning attraction flows
- Provides significant water savings

* Data analysis prepared by EA Engineering

Basis for Proposed Category III Measures

- Provide further improvement by addressing all factors affecting the estuary including:
 - Unscreened Water Diversions
 - Waste Discharge
 - Legal Fishing (Sport & Commercial)
 - Illegal Fishing
 - Land-Derived Salts
 - Exotic Species
 - Riparian, Wetland, & Estuarine Habitat
 - Channel Alteration
- Provides increased reliability of restoring the estuary through both near-term & long-term measures.
- Provides needed support for current federal Category III measures outlined in CCMP.
- Joint Water User's support a State/Federal process for funding, testing & implementation of proven Category III measures.



Basis of Proposed Monitoring Program

- To ensure flow & operational requirements are providing intended results & Category III measures are implemented
- To provide information on impacts associated with non-outflow related factors
- To provide additional information about how the ecosystem works
- To provide information to help prevent future listings
- To provide the basis for the triennial reviews of standards

